

JAERI - M

82-021

排気筒から放出される放射性雲の等濃度  
分布図および放射性雲からの等γ線照射  
線量率分布図

1982年3月

小林 秀雄・薮田 肇・片桐 浩  
小畠 一一・国分 守信

## 正 誤 表

頁	行	誤	正
1	下4	$B(r)$	$B(\mu r)$
2	19	$[\exp\{-\frac{(Z-H)^2}{2\sigma_z^2}\} + e$	$[\exp\{-\frac{(Z-H)^2}{2\sigma_z^2}\}$
4	下8	$\times \frac{E}{U}$	$\times \frac{E}{u}$
	下8, 7, 6	$D(x, y, o)$ $D_o(x, y, o)$	$D(x, y, 0)$ $D_o(x, y, 0)$

JAERI-M レポートは、日本原子力研究所が不定期に公刊している研究報告書です。

入手の問合せは、日本原子力研究所技術情報部情報資料課（〒319-11茨城県那珂郡東海村）あて、お申しこしください。なお、このほかに財團法人原子力弘済会資料センター（〒319-11 茨城県那珂郡東海村日本原子力研究所内）で複写による実費頒布をおこなっております。

JAERI-M reports are issued irregularly.

Inquiries about availability of the reports should be addressed to Information Section, Division of Technical Information, Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken 319-11, Japan.

©Japan Atomic Energy Research Institute, 1982

編集兼発行 日本原子力研究所  
印刷 いばらき印刷機

排気筒から放出される放射性雲の等濃度分布図  
および放射性雲からの等 $\gamma$ 線照射線量率分布図

日本原子力研究所東海研究所保健物理部

小林 秀雄・藪田 肇・片桐 浩

小畠 一一・国分 守信

(1982年2月9日受理)

点源から大気中に放出された放射性雲の濃度分布および放射性雲からの $\gamma$ 線照射線量率分布については、これまでに種々の計算が行われている。本報告書は、異常放出時における濃度分布および $\gamma$ 線照射線量率分布を地図上に描くことにより、放出放射性物質による影響範囲を迅速に推定し、緊急時モニタリング計画の立案と実施を円滑に行うための資料として、作成したものである。

最近は、電算機による計算結果をブラウン管上に表示することも行われているが、これら装置を持たない施設でも容易に事故の影響範囲の推定が行えるように、分布図の縮尺を1/25,000および1/50,000とし、市販の国土地理院発行の地形図上にそのまま表現できるようにした。

ここに掲げた図は、0～200 mの間の11点（ほぼ20 m間隔）の放出高について、A～Fの6クラスの安定度別に計算した結果である。 $\gamma$ 線照射線量率の計算は、林、白石が作成した計算コードGAMPULにより行った。濃度および照射線量率の計算に当たっては、「発電用原子炉施設の安全解析に関する気象指針」に従い、煙の鉛直拡散幅 $\sigma_z$ が1,000 mを超える場合は1,000 mとした。 $\sigma_z$ に制限を加えない場合の比較を風下軸上値について行った。

Isopleths of Surface Concentration and Surface Exposure Rate  
due to a Radioactive Cloud Released from a Stack

Hideo KOBAYASHI, Hajimu YABUTA  
Hiroshi KATAGIRI, Kazuichi OBATA  
and Morinobu KOKUBU

Division of Health Physics,  
Tokai Research Establishment, JAERI

(Received February 9, 1982)

Various calculations are made to estimate the distributions of concentration and  $\gamma$ -exposure rate due to a radioactive cloud released from a point source to the atmosphere.

In this report, the isopleths of concentration and  $\gamma$ -exposure rate which were calculated are given in graphs to enable rapid prediction of the influence of released radioactive material in the emergency situation.

Recently there are facilities which are equipped with a system to display the calculation results on CRT; but such practice is rather rare. By placing the calculated isopleths of reduction scale 1/25000 or 1/50000 on the usual map, any facilities without the CRT system can readily estimate the influence of an accidental release.

The graphs of isopleths are given with the release height (11 values of 0 to 200 m at about 20 m intervals) and the atmospheric stability (6 classes) as parameters.

Calculations of  $\gamma$ -exposure rates were made using the computer code GAMPUL developed by T. Hayashi and T. Shiraishi.

In the calculation of radioactive concentrations and  $\gamma$ -exposure rates, the vertical diffusion depths,  $\sigma_z$ , exceeding 1000 m are taken to be 1000 m according to the Meteorological Guide for the Safety Analysis of Power Reactor (J.AEC).

The comparison between with and without this limitation in  $\sigma_z$  is made in the case of downwind axial surface distributions.

Keywords: Isopleth, Concentration, Exposure Rate, Radioactivity, Calculation, Monitoring, Emergency, Map, Cloud, Distribution

## 目 次

1. はじめに .....	1
2. 計算方法と結果 .....	1
2.1 計算式 .....	1
2.1.1 $\gamma$ 線照射線量率 .....	1
2.1.2 放射性雲の濃度 .....	2
2.2 計算条件 .....	3
2.3 計算結果 .....	3
2.3.1 風下軸上分布 .....	3
2.3.2 等濃度分布図及び等 $\gamma$ 線照射線量率分布 .....	4
3. 図の使用法 .....	4
3.1 地表濃度の補正 .....	4
3.2 地表 $\gamma$ 線照射線量率の補正 .....	4
参考文献 .....	5
図 表 .....	6

**Contents**

1. Introduction .....	1
2. Calculation method and results .....	1
2.1 Basic equation .....	1
2.1.1 Exposure rate .....	1
2.1.2 Radioactive concentration .....	2
2.2 Calculation condition .....	3
2.3 Results .....	3
2.3.1 Distribution on the downwind axis .....	3
2.3.2 Isopleth .....	4
3. Guide for use of the distribution graphs .....	4
3.1 Surface concentration .....	4
3.2 Surface exposure rate .....	4
References .....	5
Tables and figures .....	6

## List of figures

Fig. 1-1 ~ Fig. 1-11 : Downwind axial surface concentration

- Fig. 2-1-1(A) ~ Fig. 2-1-6(B) : Isopleths of surface concentration  
(H=0 m, A ~ F)
- Fig. 2-2-1(A) ~ Fig. 2-2-6(B) : " (H=10 m, A ~ F)
- Fig. 2-3-1(A) ~ Fig. 2-3-6(B) : " (H=20 m, A ~ F)
- Fig. 2-4-1(A) ~ Fig. 2-4-6(B) : " (H=40 m, A ~ F)
- Fig. 2-5-1(A) ~ Fig. 2-5-6(B) : " (H=60 m, A ~ F)
- Fig. 2-6-1(A) ~ Fig. 2-6-6(B) : " (H=80 m, A ~ F)
- Fig. 2-7-1(A) ~ Fig. 2-7-6(B) : " (H=100 m, A ~ F)
- Fig. 2-8-1(A) ~ Fig. 2-8-6(B) : " (H=120 m, A ~ F)
- Fig. 2-9-1(A) ~ Fig. 2-9-6(B) : " (H=140 m, A ~ F)
- Fig. 2-10-1(A) ~ Fig. 2-10-6(B) : " (H=150 m, A ~ F)
- Fig. 2-11-1(A) ~ Fig. 2-11-6(B) : " (H=200 m, A ~ F)  
(A): 1/25000, (B): 1/50000)

Fig. 3-1 ~ Fig. 3-11 : Downwind axial surface exposure rate

- Fig. 4-1-1(A) ~ Fig. 4-1-6(B) : Isopleths of surface exposure rate  
(H=0 m, A ~ F)
- Fig. 4-2-1(A) ~ Fig. 4-2-6(B) : " (H=10 m, A ~ F)
- Fig. 4-3-1(A) ~ Fig. 4-3-6(B) : " (H=20 m, A ~ F)
- Fig. 4-4-1(A) ~ Fig. 4-4-6(B) : " (H=40 m, A ~ F)
- Fig. 4-5-1(A) ~ Fig. 4-5-6(B) : " (H=60 m, A ~ F)

- Fig. 4-6-1(A) ~ Fig. 4-6-6(B) : Isopleths of surface exposure rate  
(H=80 m, A ~ F)
- Fig. 4-7-1(A) ~ Fig. 4-7-6(B) : "  
(H=100 m, A ~ F)
- Fig. 4-8-1(A) ~ Fig. 4-8-6(B) : "  
(H=120 m, A ~ F)
- Fig. 4-9-1(A) ~ Fig. 4-9-6(B) : "  
(H=140 m, A ~ F)
- Fig. 4-10-1(A) ~ Fig. 4-10-6(B) : "  
(H=150 m, A ~ F)
- Fig. 4-11-1(A) ~ Fig. 4-11-6(B) : "  
(H=200 m, A ~ F)  
((A): 1/25000, (B): 1/50000)

## 1. はじめに

原子力災害が万一発生した場合、放出放射性物質による被曝から公衆を守るために、迅速に事故発生事業所周辺公衆の放射線被曝線量の評価を行い、これに基づく防災対策を講ずることが必要となる。

事故発生時には、放射性物質の放出量と気象データ及び施設周辺のモニタリングポスト等のデータから、最大被曝地点とそこでの被曝線量（内部、外部）及び事故の影響範囲の推定を行い、これらの結果に基づき防災対策に必要な情報を収集するための緊急時モニタリングを実施する。

大気中に放出された放射性雲の濃度分布及び放射性雲からの $\gamma$ 線照射線量率分布を時々刻々の放出量及び気象データから迅速に推定するとともに緊急時モニタリングで得られたデータにより、これら推定値の補正を行うことが重要になる。最近は電算機により計算を行い、結果をブラウン管上に表示することも行われているが、事業所及び原子力防災対策本部等で必ずしもこれらのシステムを備えているとは限らないので、これら事業所等でも容易に事故の影響範囲の推定が行えるように、我々は本報告において分布図の縮尺を1/25,000及び1/50,000とし、市販の国土地理院発行の地形図上にそのまま表現できるような図を作成した。

ここに掲げた図は、0～200 mの間のほぼ20 m間隔の11放出高について、A～Fの6クラスの安定度別に計算した結果である。 $\gamma$ 線照射線量率の計算は、林、白石が作成した計算コードGAMPUL<sup>1)</sup>により行った。濃度及び照射線量率の計算は、「発電用原子炉施設の安全解析に関する気象指針」<sup>2)</sup>に従い、放射性雲の鉛直拡散幅 $\sigma_z$ が1,000 mを超える場合は1,000 mとした。 $\sigma_z$ に制限を加えない場合の比較を風下軸上値について行った。 $\gamma$ 線照射線量率分布図の1/50,000縮尺の安定度A～Cの曲線がやや歪んでいるが、これは計算時間との関係で遠距離の計算点をやや粗くとったので、曲線の精度が若干悪くなっているためである。

## 2. 計算方法と結果

### 2.1 計算式

#### 2.1.1 $\gamma$ 線照射線量率

放射性雲からの $\gamma$ 線による地表付近の照射線量率の計算は、(1)式により行った。

$$D(x, y, 0) = \frac{K_o}{4\pi} \cdot \mu_a \cdot E \int_0^\infty \int_{-\infty}^\infty \int_0^\infty \frac{B(x', r)}{r^2} \cdot \exp(-\mu \cdot r) \cdot x(x', y', z') \cdot dx' \cdot dy' \cdot dz' \quad (1)$$

ただし、 $D(x, y, 0)$ ：地表付近の $\gamma$ 線照射線量率 [ $\mu R/h$ ]

$K_o$  : 放射能から $\gamma$ 線照射線量率への換算係数

$$K_o = 1.88 \times 10^9 \left[ \frac{\text{dis} \cdot m^3 \cdot \mu R}{\text{MeV} \cdot \text{Ci} \cdot h} \right]$$

## 1. はじめに

原子力災害が万一発生した場合、放出放射性物質による被曝から公衆を守るために、迅速に事故発生事業所周辺公衆の放射線被曝線量の評価を行い、これに基づく防災対策を講ずることが必要となる。

事故発生時には、放射性物質の放出量と気象データ及び施設周辺のモニタリングポスト等のデータから、最大被曝地点とそこでの被曝線量（内部、外部）及び事故の影響範囲の推定を行い、これらの結果に基づき防災対策に必要な情報を収集するための緊急時モニタリングを実施する。

大気中に放出された放射性雲の濃度分布及び放射性雲からの $\gamma$ 線照射線量率分布を時々刻々の放出量及び気象データから迅速に推定するとともに緊急時モニタリングで得られたデータにより、これら推定値の補正を行うことが重要になる。最近は電算機により計算を行い、結果をブラウン管上に表示することも行われているが、事業所及び原子力防災対策本部等で必ずしもこれらのシステムを備えているとは限らないので、これら事業所等でも容易に事故の影響範囲の推定が行えるように、我々は本報告において分布図の縮尺を1/25,000及び1/50,000とし、市販の国土地理院発行の地形図上にそのまま表現できるような図を作成した。

ここに掲げた図は、0～200 mの間のほぼ20 m間隔の11放高について、A～Fの6クラスの安定度別に計算した結果である。 $\gamma$ 線照射線量率の計算は、林、白石が作成した計算コードGAMPUL<sup>1)</sup>により行った。濃度及び照射線量率の計算は、「発電用原子炉施設の安全解析に関する気象指針」<sup>2)</sup>に従い、放射性雲の鉛直拡散幅 $\sigma_z$ が1,000 mを超える場合は1,000 mとした。 $\sigma_z$ に制限を加えない場合の比較を風下軸上値について行った。 $\gamma$ 線照射線量率分布図の1/50,000縮尺の安定度A～Cの曲線がやや歪んでいるが、これは計算時間との関係で遠距離の計算点をやや粗くとったので、曲線の精度が若干悪くなっているためである。

## 2. 計算方法と結果

### 2.1 計算式

#### 2.1.1 $\gamma$ 線照射線量率

放射性雲からの $\gamma$ 線による地表付近の照射線量率の計算は、(1)式により行った。

$$D(x, y, 0) = \frac{K_o}{4\pi} \cdot \mu_a \cdot E \int_0^\infty \int_{-\infty}^\infty \int_0^\infty \frac{B(z, r)}{r^2} \cdot \exp(-\mu \cdot r) \cdot \chi(x', y', z') \cdot dx' \cdot dy' \cdot dz' \quad (1)$$

ただし、 $D(x, y, 0)$ ：地表付近の $\gamma$ 線照射線量率 [ $\mu R/h$ ]

$K_o$  : 放射能から $\gamma$ 線照射線量率への換算係数

$$K_o = 1.88 \times 10^9 \left[ \frac{\text{dis} \cdot m^3 \cdot \mu R}{\text{MeV} \cdot \text{Ci} \cdot h} \right]$$

E :  $\gamma$  線の初期エネルギー [MeV/dis]  
 $\mu$  : 空気に対する  $\gamma$  線の全吸収係数 [ $m^{-1}$ ]  
 $\mu_a$  : " 真吸収係数 [ $m^{-1}$ ]  
 B ( $\mu r$ ) : " 線量再生係数  
 x, y : 評価地点の位置 [m]  
 r : 着目している放射性雲中の微小体積要素から評価地点までの距離 [m]  
 $\chi(x', y', z')$  : 核種の放射性雲の濃度 [Ci/m<sup>3</sup>]

なお, B ( $\mu r$ ) は, (2)式により求めた

$$B(\mu r) = 1 + \alpha(\mu r) + \beta(\mu r)^2 + \gamma(\mu r)^3 \quad \text{--- (2)}$$

ただし,  $\mu_a$ ,  $\mu$ ,  $\alpha$ ,  $\beta$ ,  $\gamma$  については, 0.5 MeV の  $\gamma$  線に対する値を用いた。

また, 放射性雲の濃度  $\chi$  は, (3)式に示すとおりである。

### 2.1.2 放射性雲の濃度

放射性雲の濃度は, 以下の仮定に基づく Pasquill の式 (英国気象局式 : (3)式) により算出した。

- 1) 空気中を運ばれる物質の重力落下・沈着を考慮しない。
- 2) 放出時間を通じて風向が一定である。
- 3) 物質の拡散による濃度分布が, 風向に垂直な面上, 水平方向及び垂直方向ともに, ガウス分布であるとする。

$$\chi(x, y, z) = \frac{Q}{2\pi \cdot 3,600 \cdot u \cdot \sigma_y \cdot \sigma_z} \cdot \exp\left(-\frac{\lambda}{u}x\right) \cdot \exp\left(-\frac{y^2}{2\sigma_y^2}\right) \cdot \left[ \exp\left\{-\frac{(Z-H)^2}{2\sigma_z^2}\right\} + e\right. \quad \text{--- (3)}$$

ただし, Q : 放射性核種の放出率 [Ci/h]  
 $\lambda$  : 問題とする核種の物理的壊変定数 [sec<sup>-1</sup>]  
 u : 放出点における平均風速 [m/s]  
 H : 放出高 [m]  
 x, y, z : 放出点を原点とする直角座標系 (風向方向を x 軸とする。) [m]  
 $\sigma_y$ ,  $\sigma_z$  : 濃度分布の y 及び z 方向の標準偏差 [m]

なお,  $\sigma_y$ ,  $\sigma_z$  は, 各安定度毎に(4), (5)式及び Table 1 の値により算出した。

$$\sigma_y = 0.67775 \times 10^{-4} \cdot \theta_0 \cdot x \cdot (8 - \log x) \quad \text{--- (4)}$$

$$\sigma_z = \sigma_0 \cdot x^{(a_0 + a_1 \log x + a_2 (\log x)^2)} \quad \text{--- (5)}$$

x : 軸上風下距離 [km]

また, 使用している大気安定度は, Table 2 で定義されるものである。

以上の計算式により, 地表濃度及び  $\gamma$  線照射線量率を算出した。なお,  $\gamma$  線照射線量率の算出には, 計算コード GAMPUL を使用した。

## 2.2 計算条件

地表濃度及び $\gamma$ 線照射線量率の算出は、次の条件で行った。

- $u = 1 \text{ m/s}$
- $Q = 1 \text{ Ci/h}$
- $E = 1 \text{ MeV/dis}$
- $\mu, \mu_a$  は、 $0.5 \text{ MeV}$  のエネルギーに対する値を用いた。
- $\sigma_z$  は、「発電用原子炉施設の安全解析に関する気象指針」(以下「気象指針」という)に基づき、 $\sigma_z$  が  $1,000 \text{ m}$  を超える場合には、 $1,000 \text{ m}$  として取扱った。
- 拡散中の核種の減衰は考慮しない。 $((3) \text{ 式において } \lambda = 0)$
- また計算項目は、次のとおりである。
- 大気安定度：A～F の計 6 クラス
- 放出高(H)： $0, 10, 20, 40, 60, 80, 100, 120, 140, 150, 200 \text{ m}$  の計 11 とおり
- 縮 尺： $1/25,000, 1/50,000$

## 2.3 計算結果

### 2.3.1 風下軸上分布

風下軸上の地表濃度分布を Fig. 1-1 から Fig. 1-11 に、地表 $\gamma$ 線照射線量率分布を Fig. 3-1 から Fig. 3-11 に、各放出高毎に安定度をパラメータとして示した。作図範囲は風下軸上  $100 \text{ m}$  から  $100 \text{ km}$  の範囲である。図中の実線は、「気象指針」に基づき  $\sigma_z$  値が  $1,000 \text{ m}$  以上の場合には、 $1,000 \text{ m}$  として計算した結果を示し、破線は  $\sigma_z$  を制限しないで計算した結果を示す。

### 2.3.2 等濃度分布図及び等 $\gamma$ 線照射線量率分布

地表等濃度分布図を Fig. 2-1-1(A) から Fig. 2-11-6(B) に、地表等 $\gamma$ 線照射線量率分布図を Fig. 4-1-1(A) から Fig. 4-11-6(B) に、放出高、安定度及び縮尺別に示す。作図範囲は、濃度では、 $1/25,000$  で  $x$  方向  $0 \sim 6 \text{ km}$ ,  $y$  方向  $-2 \sim 2 \text{ km}$ ,  $1/50,000$  で  $x$  方向  $0 \sim 12 \text{ km}$ ,  $y$  方向  $-4 \sim 4 \text{ km}$  であり、線量率では、 $1/25,000$  で  $x$  方向  $-1 \sim 5 \text{ km}$ ,  $y$  方向  $-2 \sim 2 \text{ km}$ ,  $1/50,000$  で  $x$  方向  $-2 \sim 10 \text{ km}$ ,  $y$  方向  $-4 \sim 4 \text{ km}$  である。また図中、等値線の値で負の整数で示したものは、 $10$  のべき乗の指数を表わすものである。たとえば、“ $-7$ ”は“ $10^{-7}$ ”を意味している。

なお、濃度の単位は、計算式 ((1), (3) 式) では  $\text{Ci/m}^3$  であるが、Fig. 1-1～Fig. 2-11-6(B) では、作図上の都合により  $\mu\text{Ci/m}^3$ とした。

### 3. 図の使用法

前述のように、ここに掲げたすべての図の計算は、 $u = 1\text{m/s}$ ,  $Q = 1\text{Ci/hr}$ , 及び $\gamma$ 線照射線量率計算において $E = 1\text{MeV/dis}$ の条件下で行ってるので、この図を使用する場合は、次の3-1, 3-2に示す補正を行う。

また、等濃度分布図及び等照射線量率分布図の縮尺を $1/25,000$ 及び $1/50,000$ とし、国土地理院発行の地図に合せて作成してあるので、本計算による図のうち、その時の大気安定度及び放出高にあった図を選び、地図上に、その時の風向と分布図の風下軸を合せて重ね合せ、下記の手法により値の補正を行えば、放出放射性雲からの影響評価が容易に可能である。

#### 3.1 地表濃度の補正

地表濃度分布においては、(6)式の補正を行えばよい。

$$\chi(x, y, 0) = \chi_0(x, y, 0) \times \frac{Q}{u} \times 10^{-6} \quad \text{--- (6)}$$

ただし、 $\chi(x, y, 0)$ ：実際の条件下での補正濃度値 [ $\text{Ci/m}^3$ ]

$\chi_0(x, y, 0)$ ：図より読みとった濃度値 [ $\mu\text{Ci/m}^3$ ]

$Q$  : 実際の条件下での放出率 [ $\text{Ci/h}$ ]

$u$  : " 風速 [ $\text{m/s}$ ]

#### 3.2 地表 $\gamma$ 線照射線量率の補正

地表 $\gamma$ 線照射線量率分布においては、 $\mu_a, \mu$ が $\gamma$ 線エネルギーの関数となっているため、厳密には、 $\gamma$ 線エネルギーに比例はしないが、通常の評価では(7)式により補正すれば十分である。

$$D(x, y, 0) = D_0(x, y, 0) \times \frac{E}{U} \cdot Q \quad \text{--- (7)}$$

ただし、 $D(x, y, 0)$ ：実際の条件下での補正 $\gamma$ 線照射線量率値 [ $\mu\text{R/h}$ ]

$D_0(x, y, 0)$ ：図より読みとった $\gamma$ 線照射線量率値 [ $\mu\text{R/h}$ ]

$E$  : 実際の条件下での $\gamma$ 線初期エネルギー [ $\text{MeV/dis}$ ]

$u$  : " 風速 [ $\text{m/s}$ ]

$Q$  : " 放出率 [ $\text{Ci/h}$ ]

なお、正確な評価値が必要とされる場合は、参考文献(1), (3)にあるエネルギー修正係数を用いて、補正を行えばよい。

## 参 考 文 献

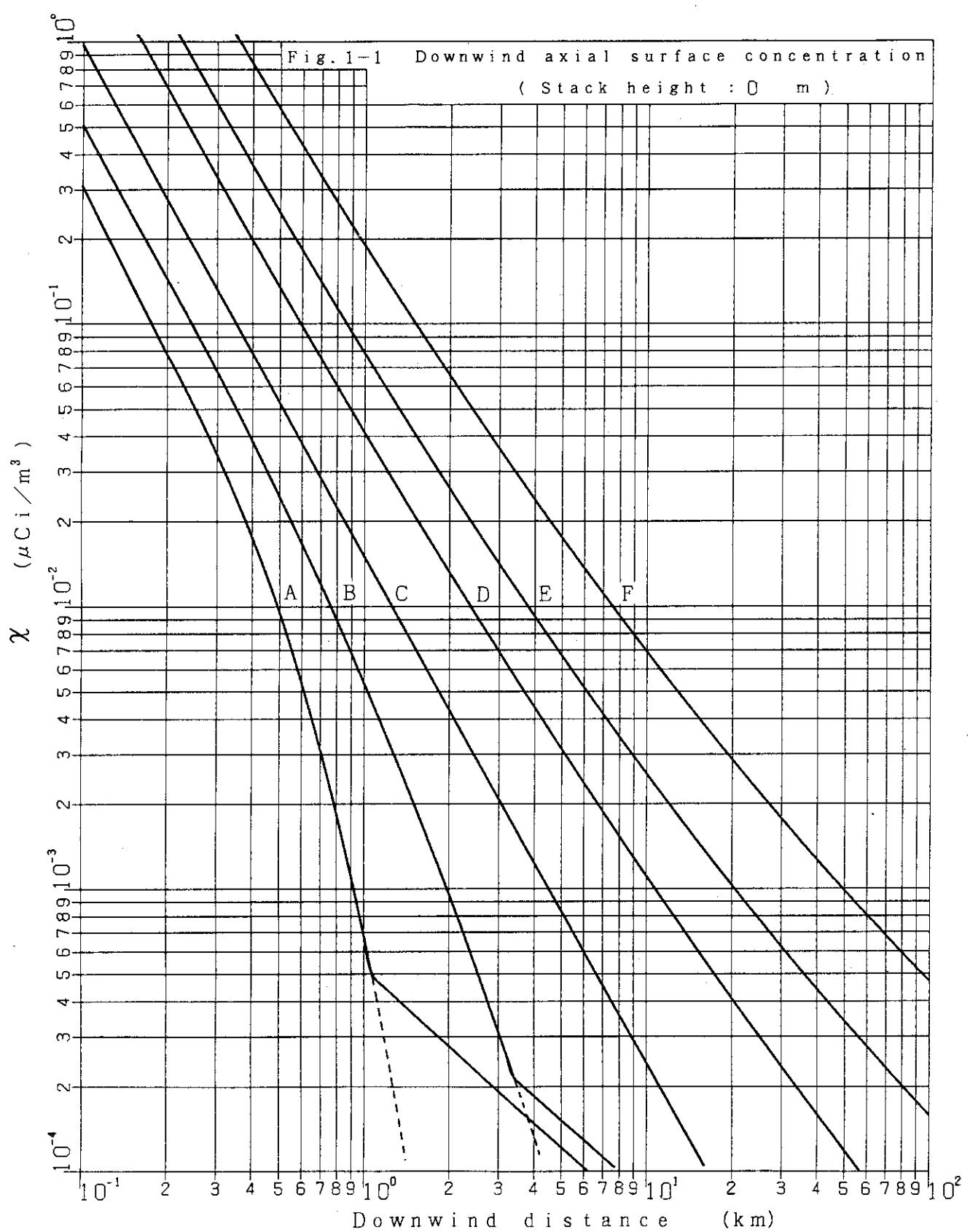
- 1) 林 隆, 白石忠男: 排気筒から放出される放射性雲からの $\gamma$ 線照射線量率, JAERI - M 8793 (1980).
- 2) 原子力委員会: 発電用原子炉施設の安全解析に関する気象指針, 原子力委員会月報, Vol. 22 No. 6, 1977.
- 3) 今井和彦, 飯嶋敏哲, 角田道生: 点源から放出される放射性雲からの $\gamma$ 線照射分布計算図, JAERI - 1189 (1970).

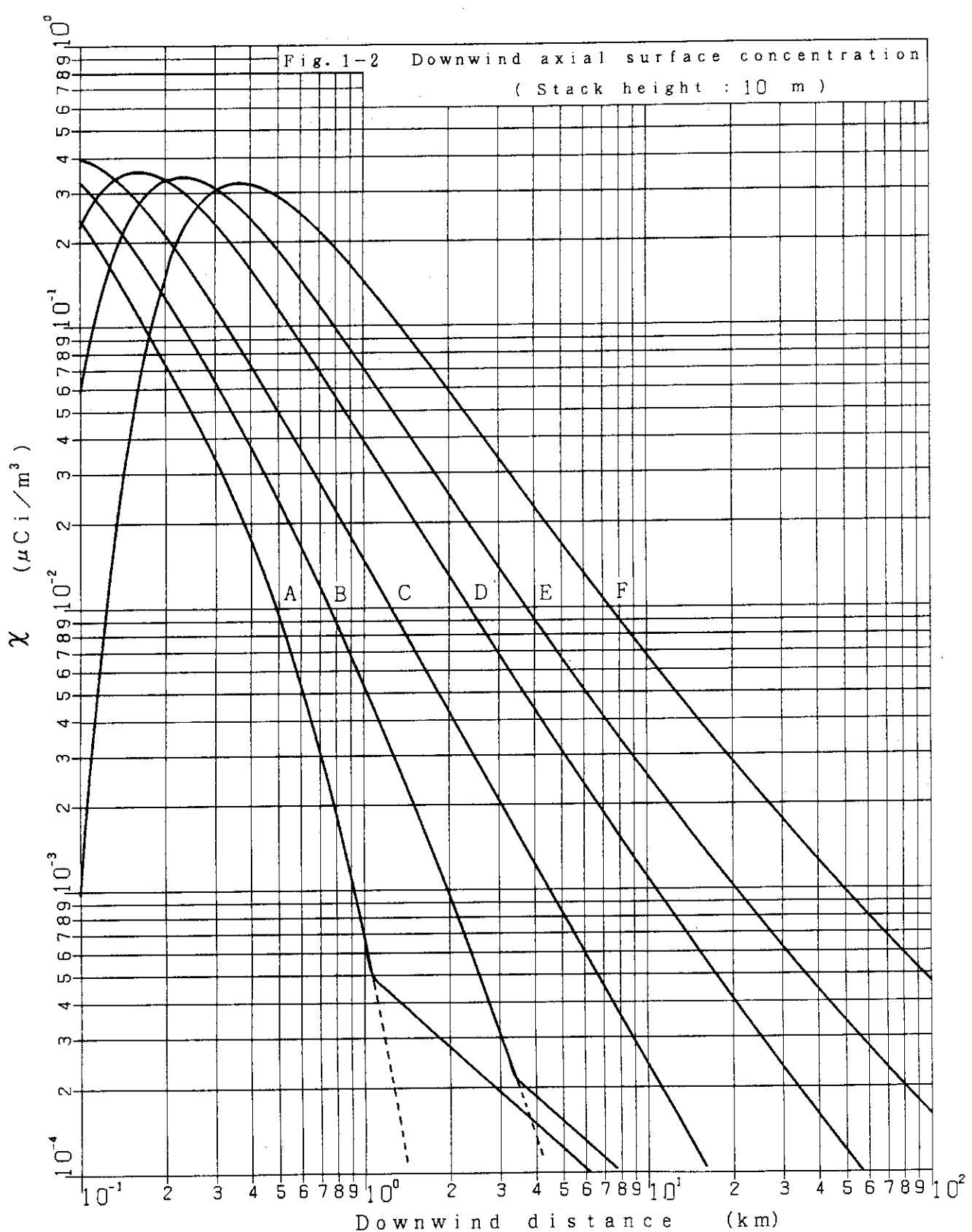
Table 1 Constants in the formulae of  $\sigma_y$  and  $\sigma_z$ 

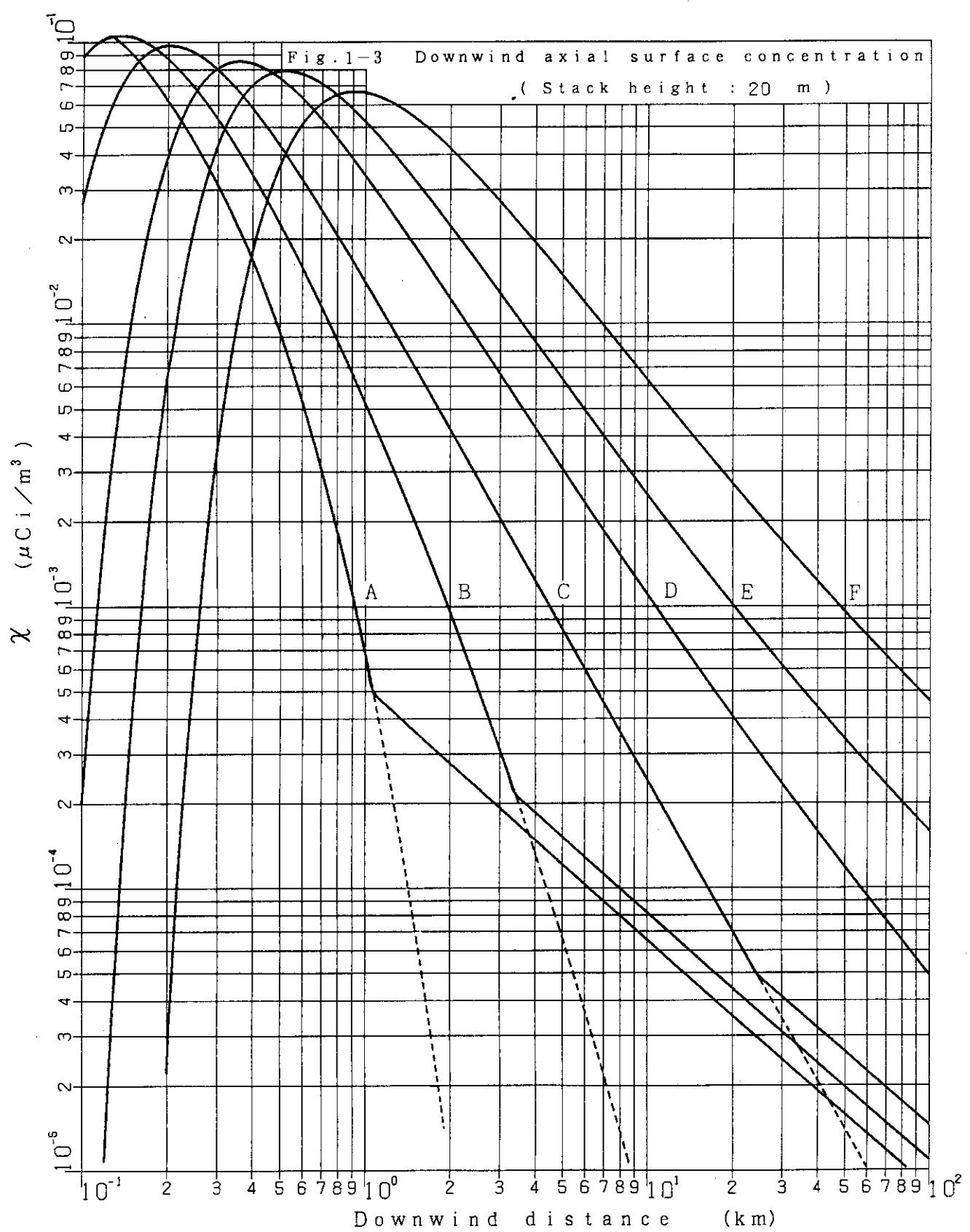
Stability	$\sigma_x$ $\theta_0$	$\sigma_z, x \geq 0.2 \text{ km}$				$\sigma_z, x < 0.2 \text{ km}$ $a_1 = a_2 = 0$	
		$\sigma_0$	$a_0$	$a_1$	$a_2$	$\sigma_0$	$a_0$
A	50	768.1	3.9077	3.898	1.7330	165.0	1.07
B	40	122.0	1.4132	0.49523	0.12772	83.7	0.894
C	30	58.1	0.8916	-0.001649	0.0	58.0	0.891
D	20	31.7	0.7626	-0.095108	0.0	33.0	0.854
E	15	22.2	0.7117	-0.12697	0.0	24.4	0.854
F	10	13.8	0.6582	-0.1227	0.0	15.5	0.822

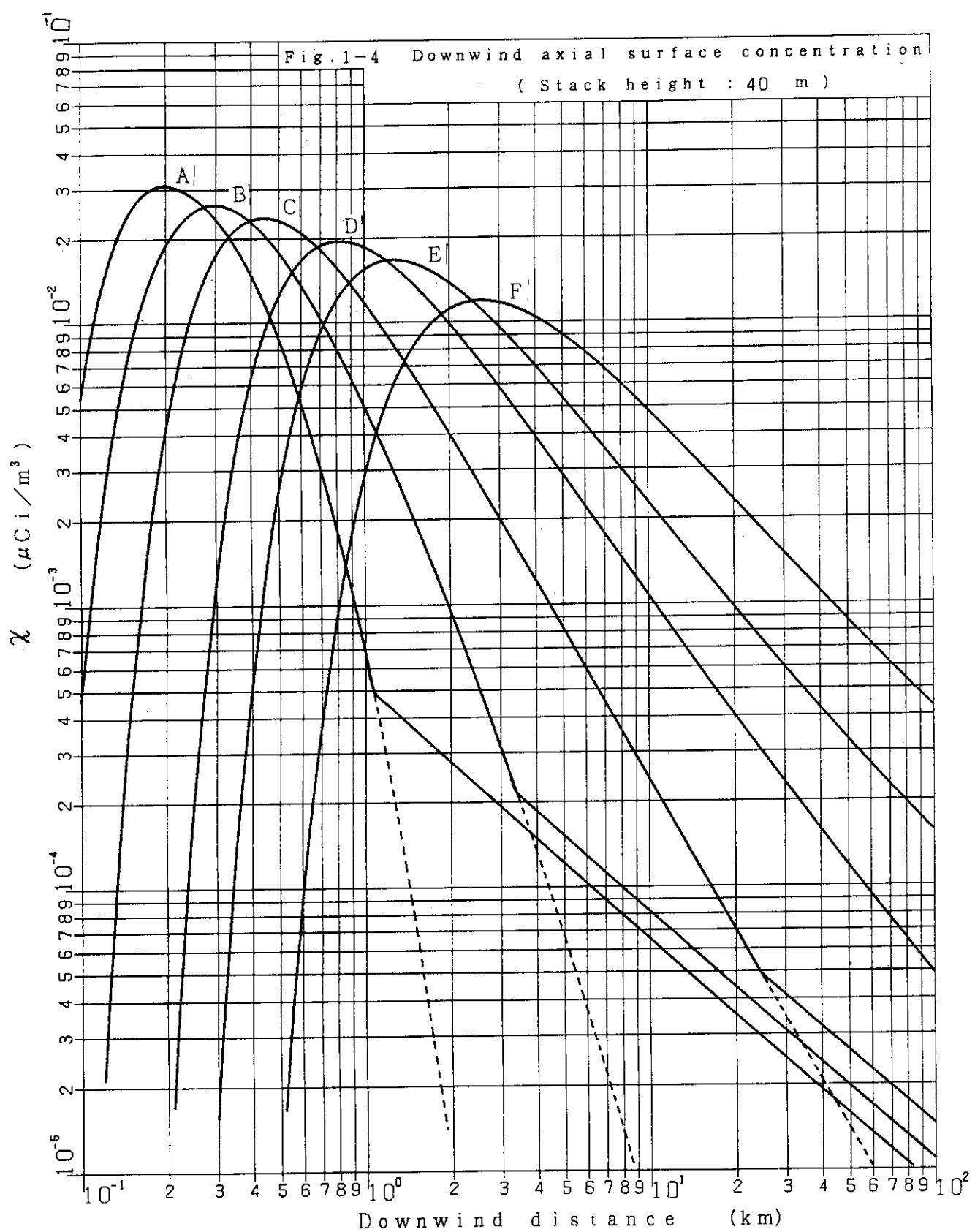
Table 2 Atmospheric stability classification

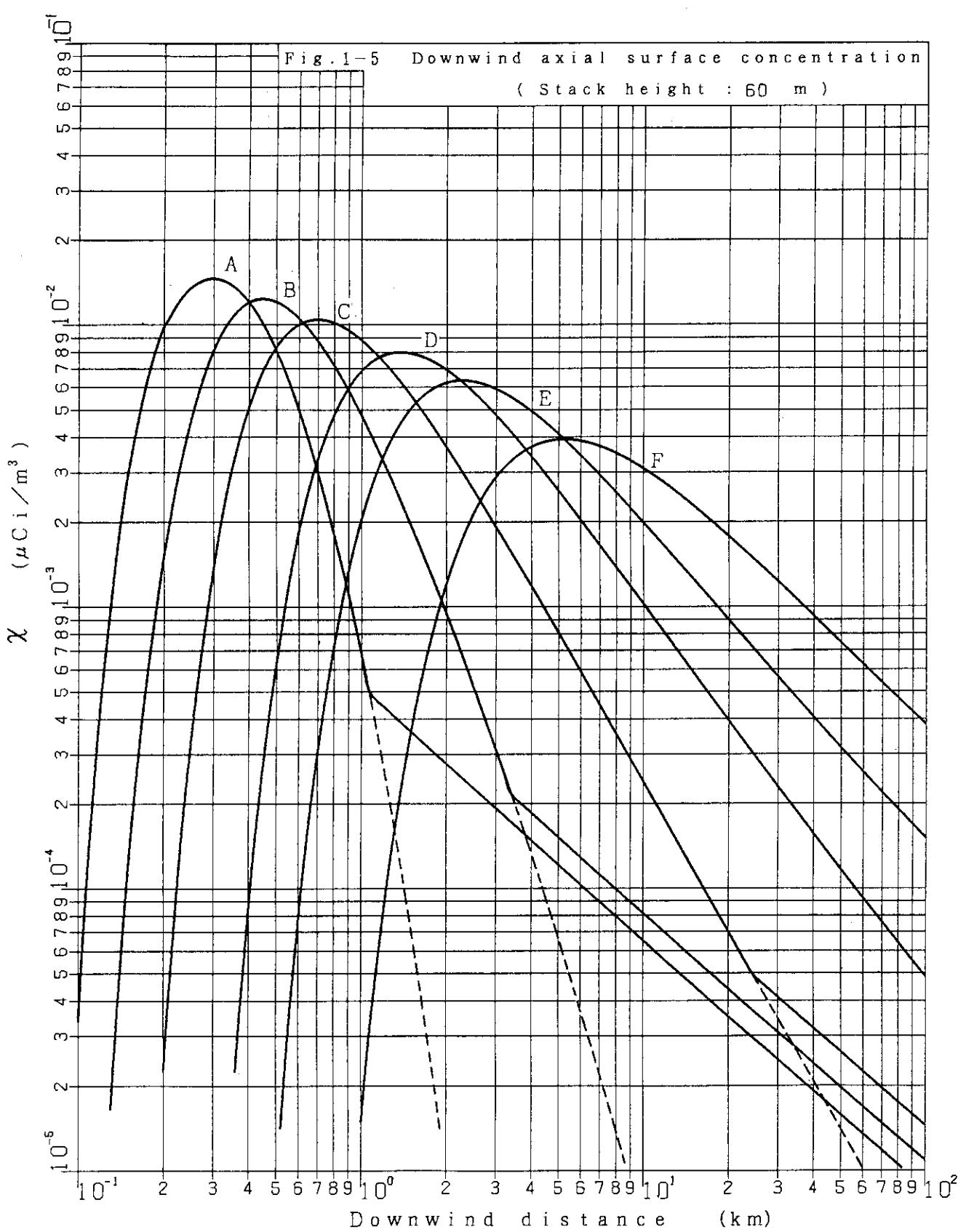
Wind speed (u) m/s	Daytime				Night		
	Solar radiation (T) (cal cm <sup>-2</sup> hr <sup>-1</sup> )				Net radiation (Q) (cal cm <sup>-2</sup> hr <sup>-1</sup> )		
	T ≥ 50	50 > T ≥ 25	25 > T ≥ 12.5	12.5 > T	Q > -1.8	-1.8 ≥ Q > -3.6	-3.6 ≥ Q
u < 2	A	A-B	B	D	D	G	G
2 ≤ u < 3	A-B	B	C	D	D	E	F
3 ≤ u < 4	B	B-C	C	D	D	D	E
4 ≤ u < 6	C	C-D	D	D	D	D	D
6 ≤ u	C	D	D	D	D	D	D

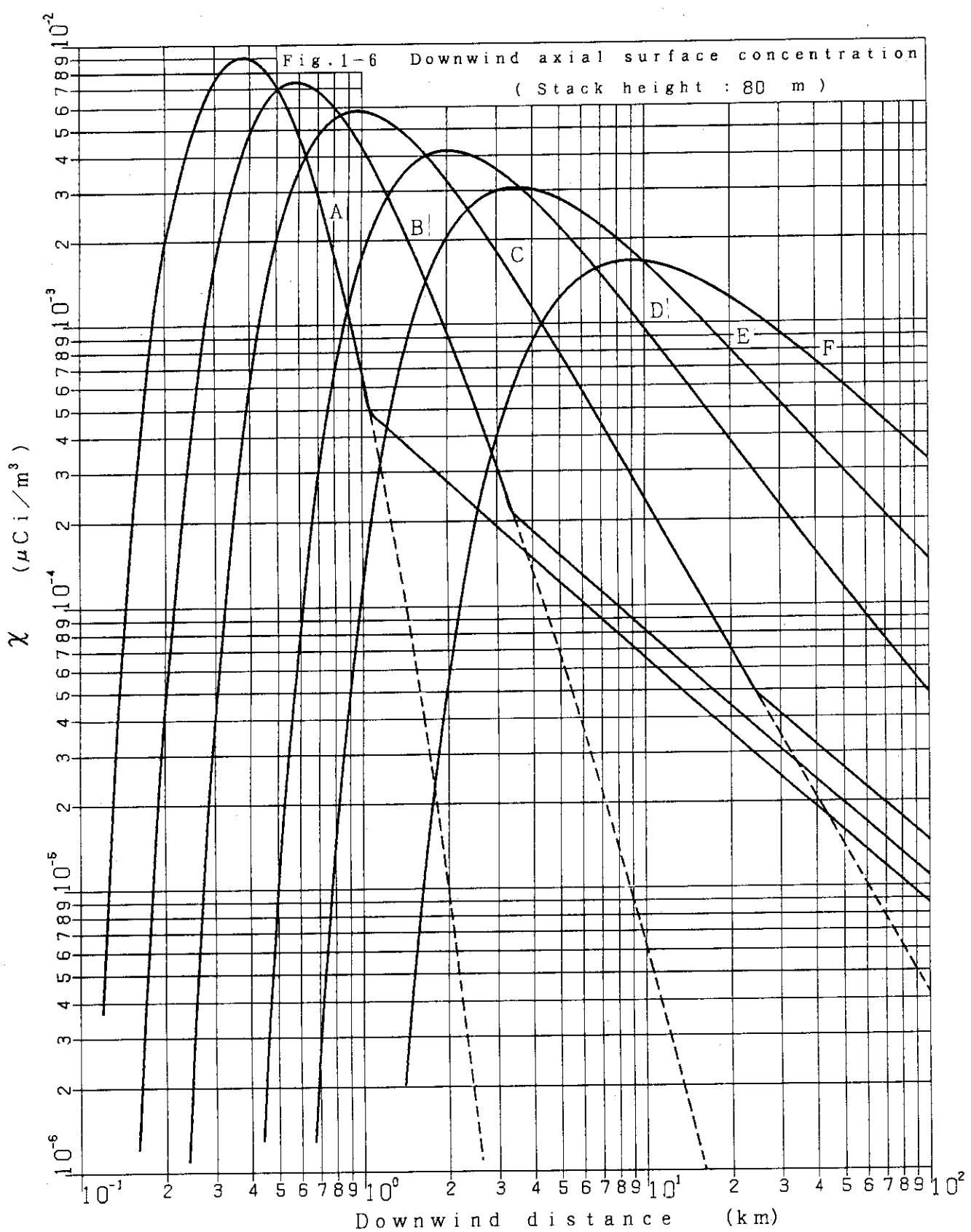


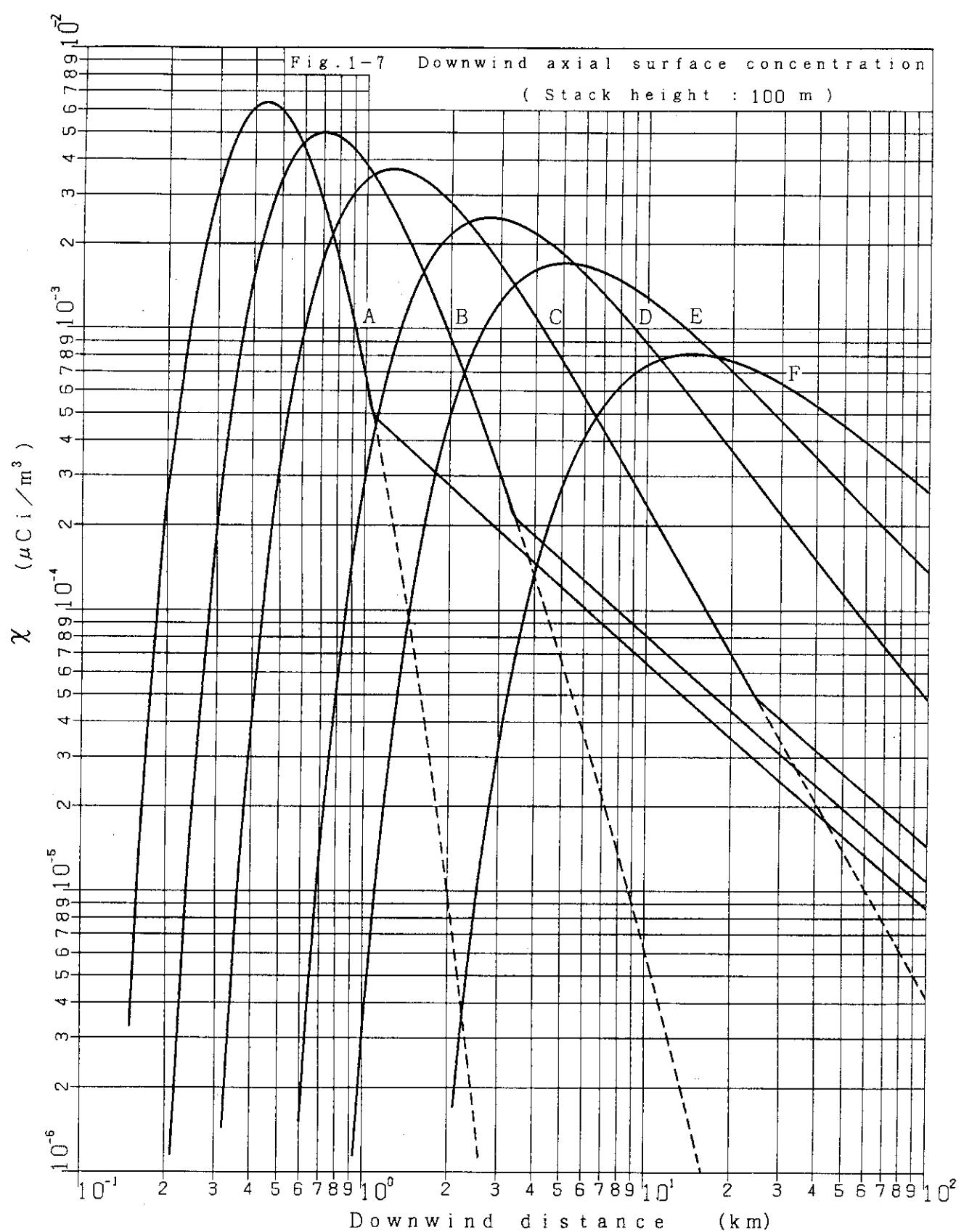


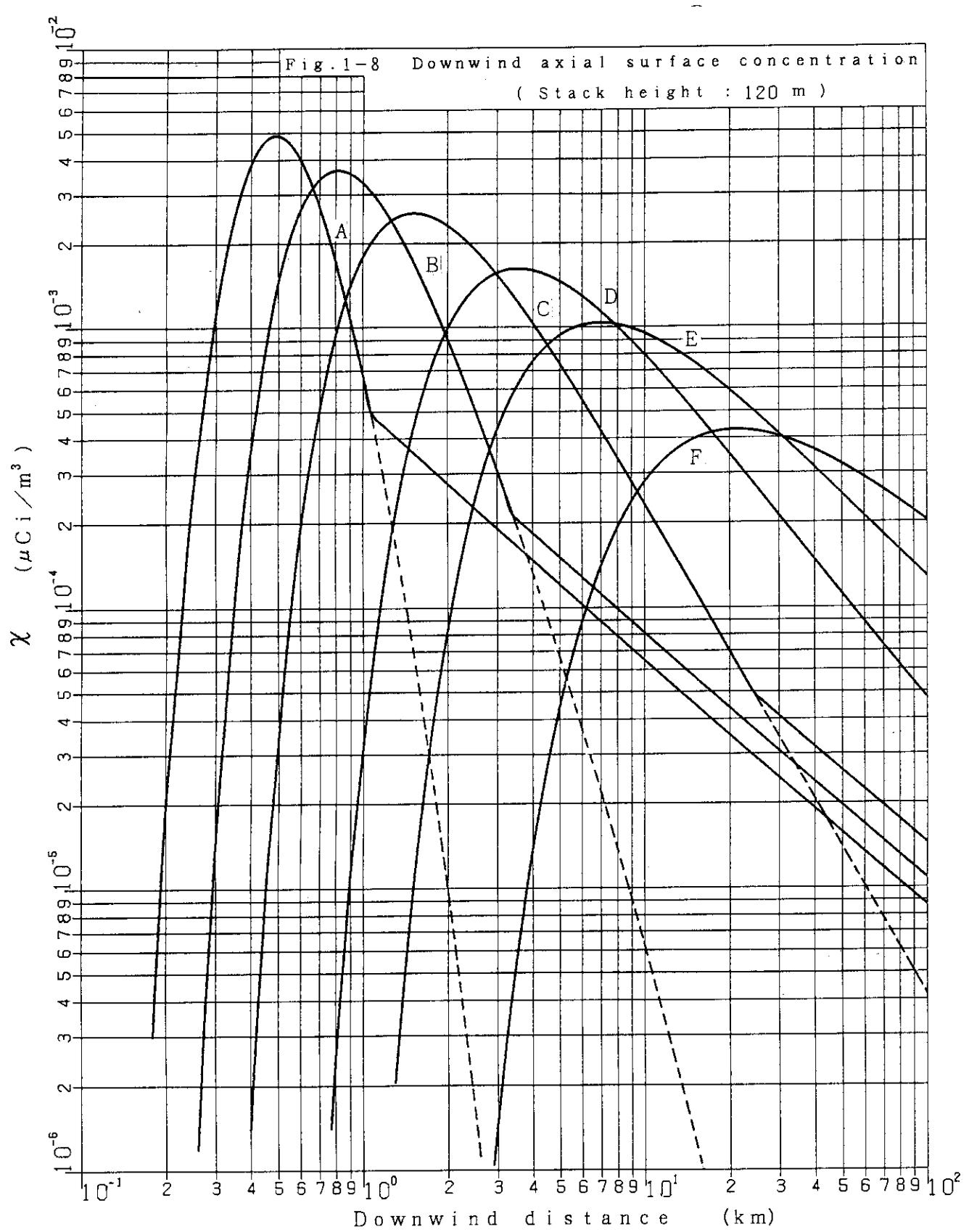


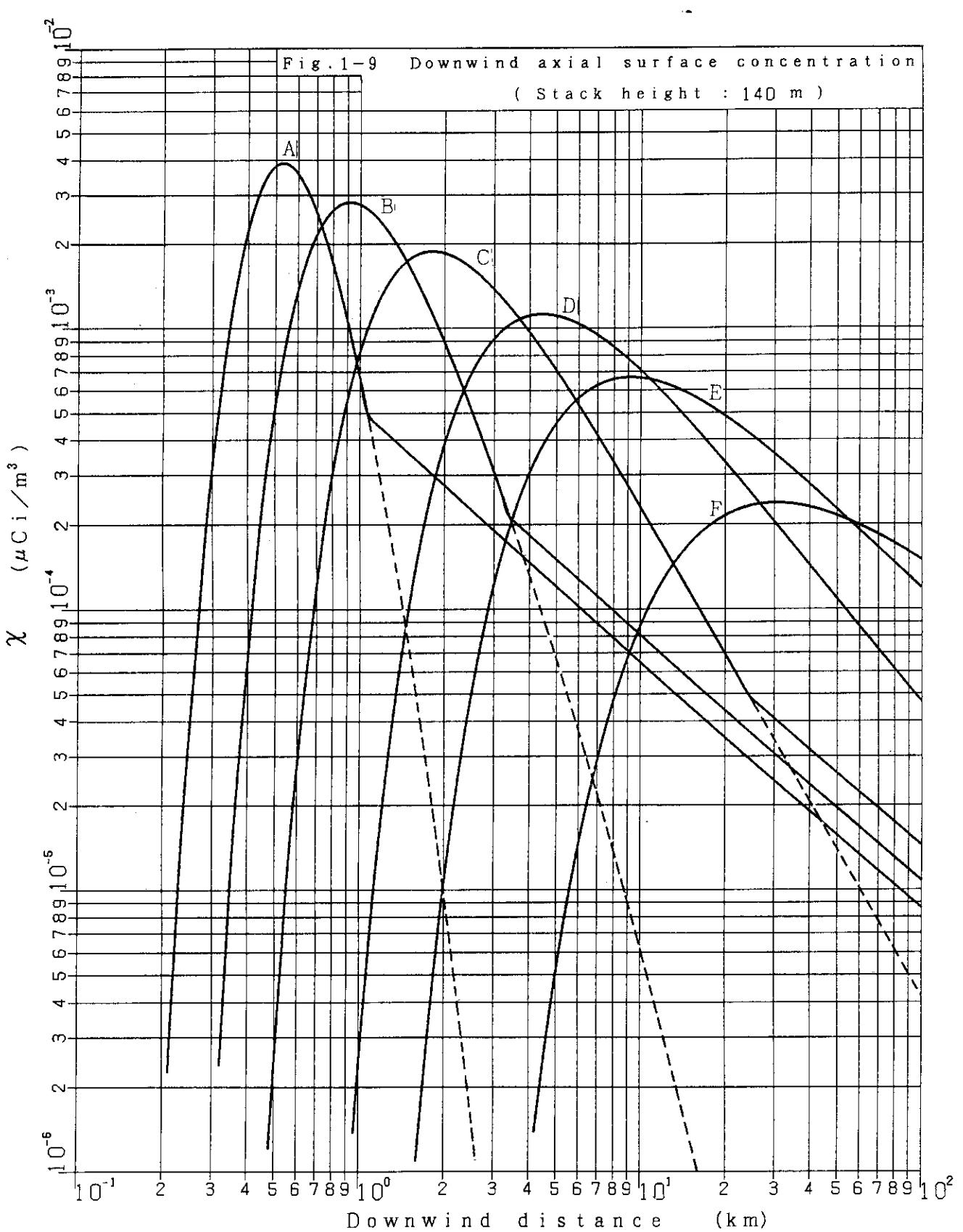


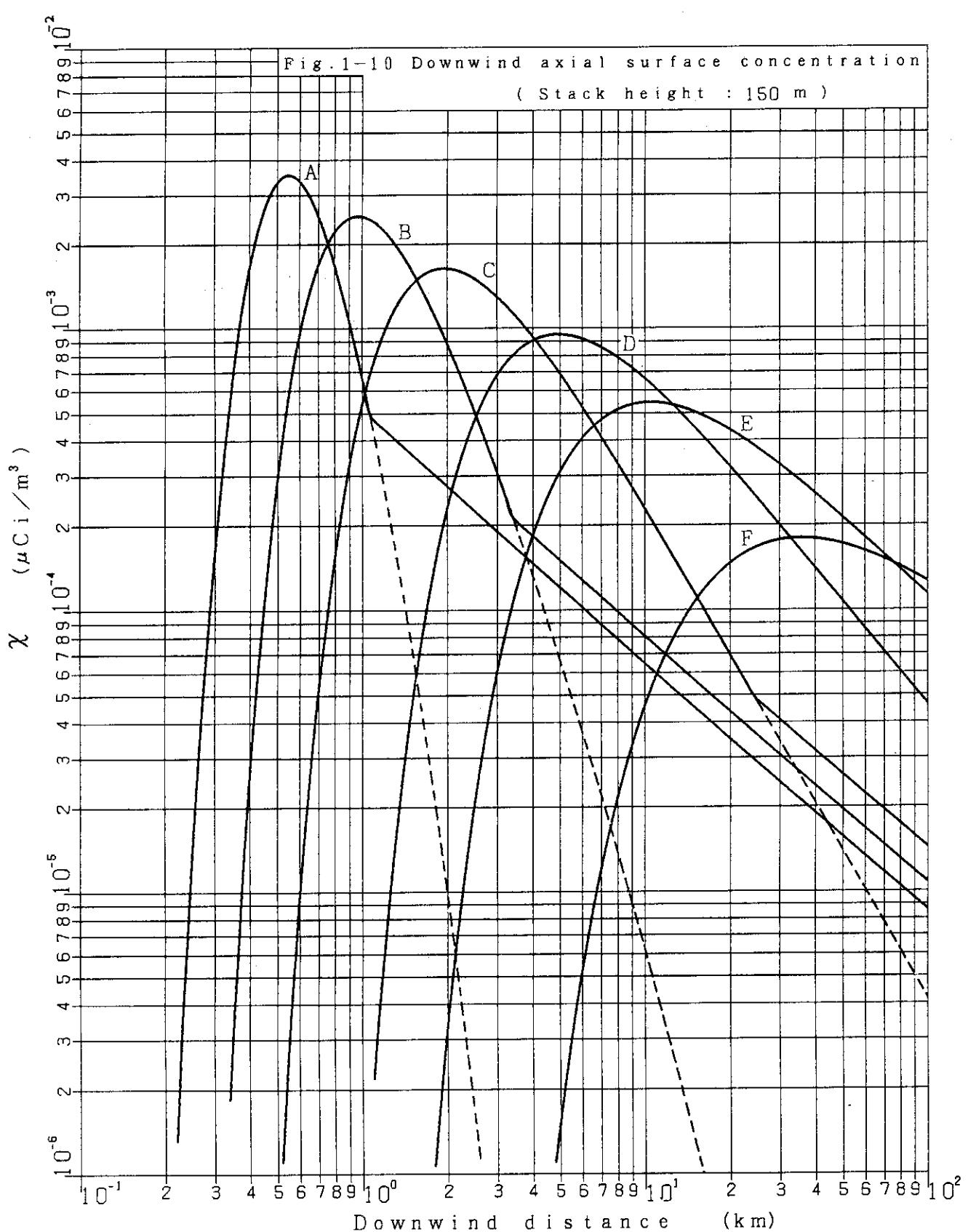


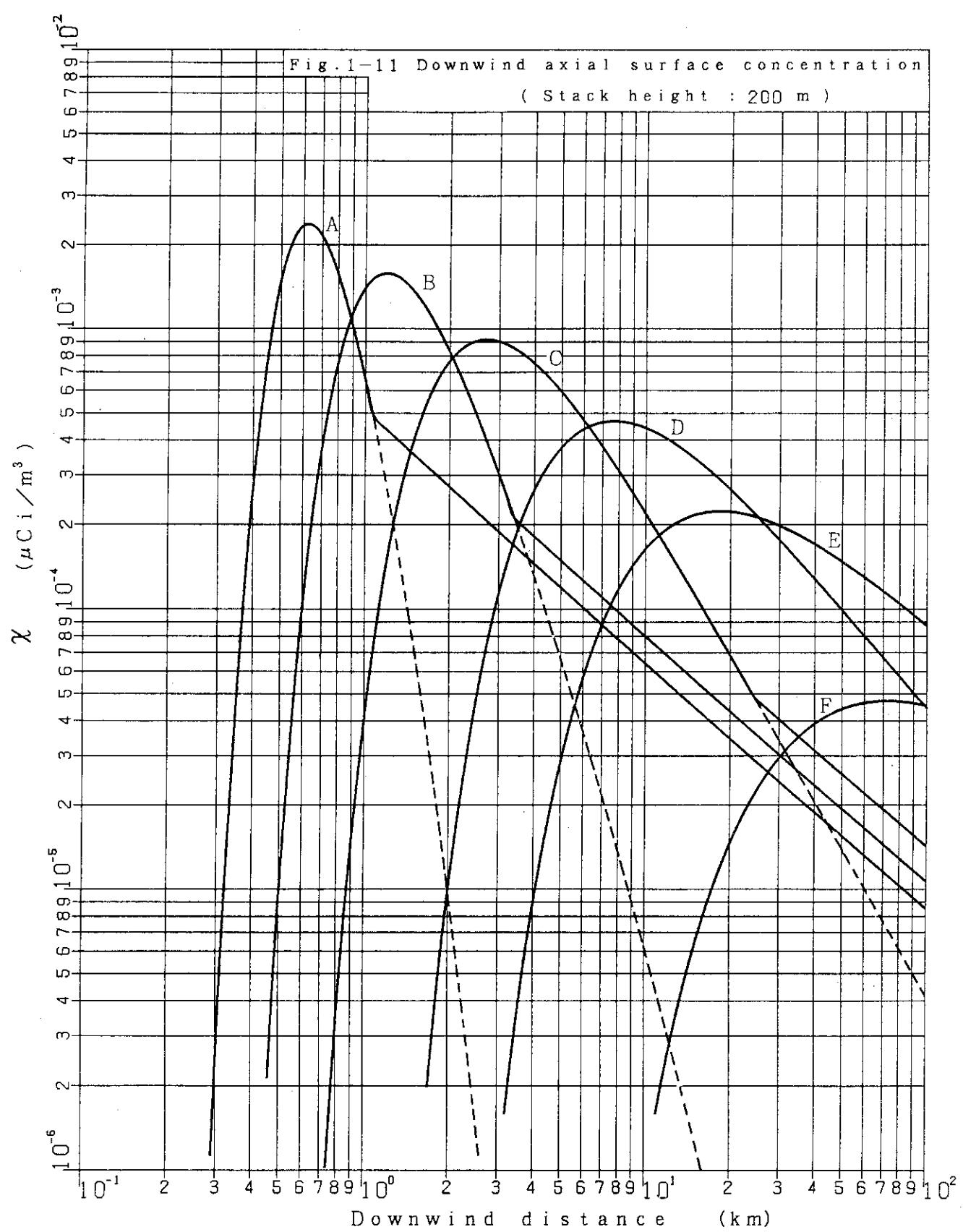












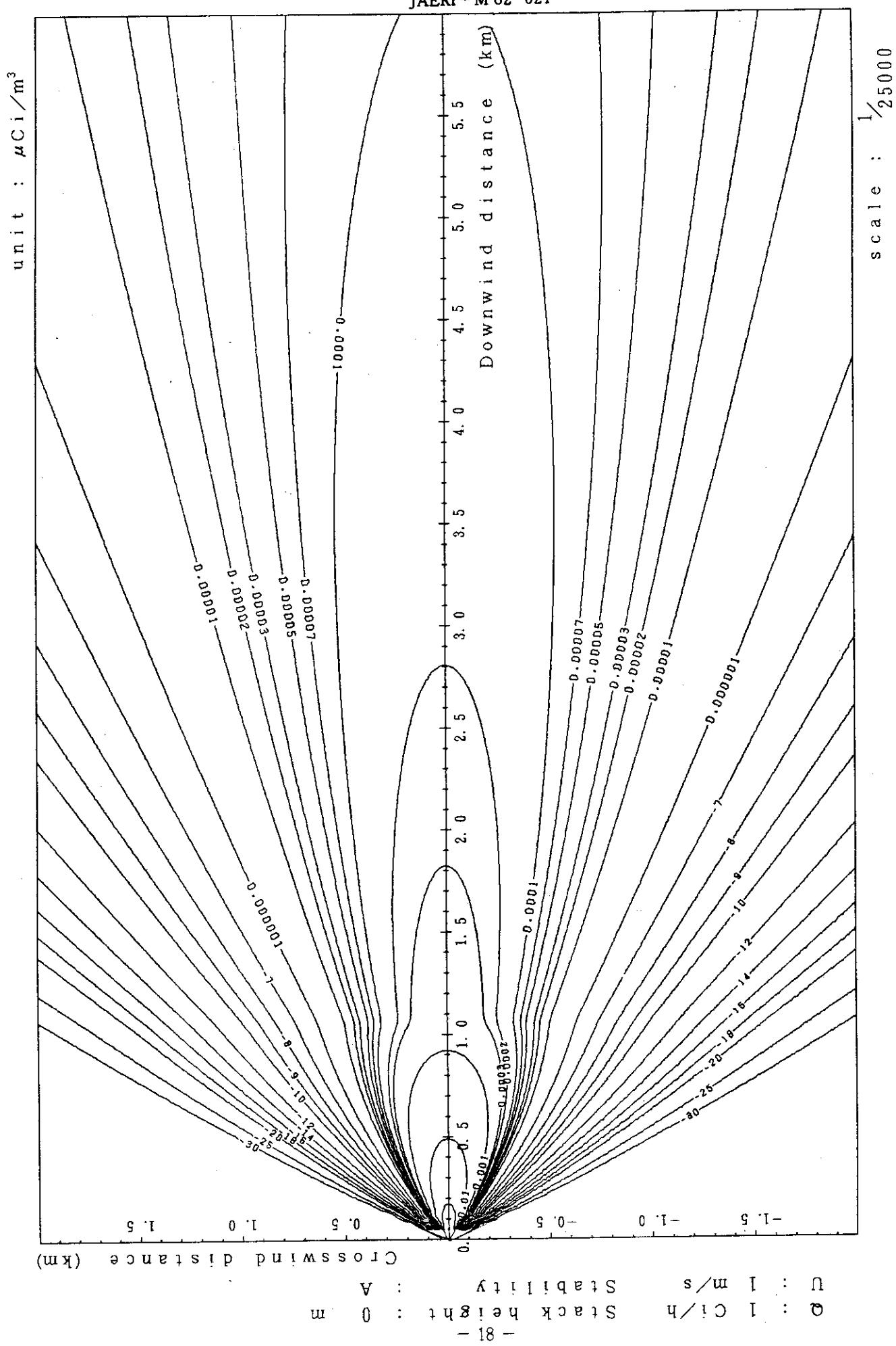


Fig. 2-1-1(A) Isopleths of surface concentration

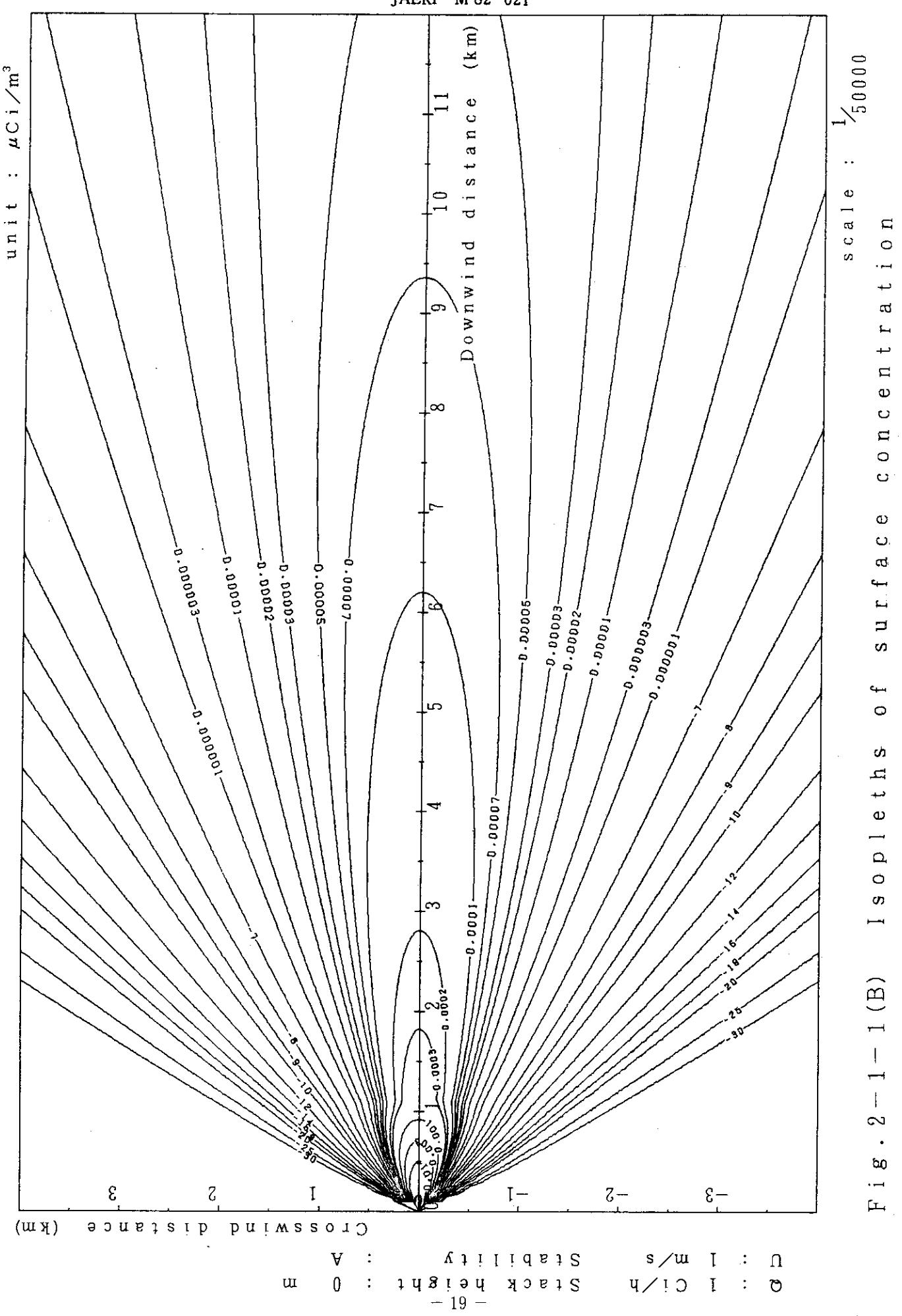


Fig. 2-1-1(B) Isopleths of surface concentration

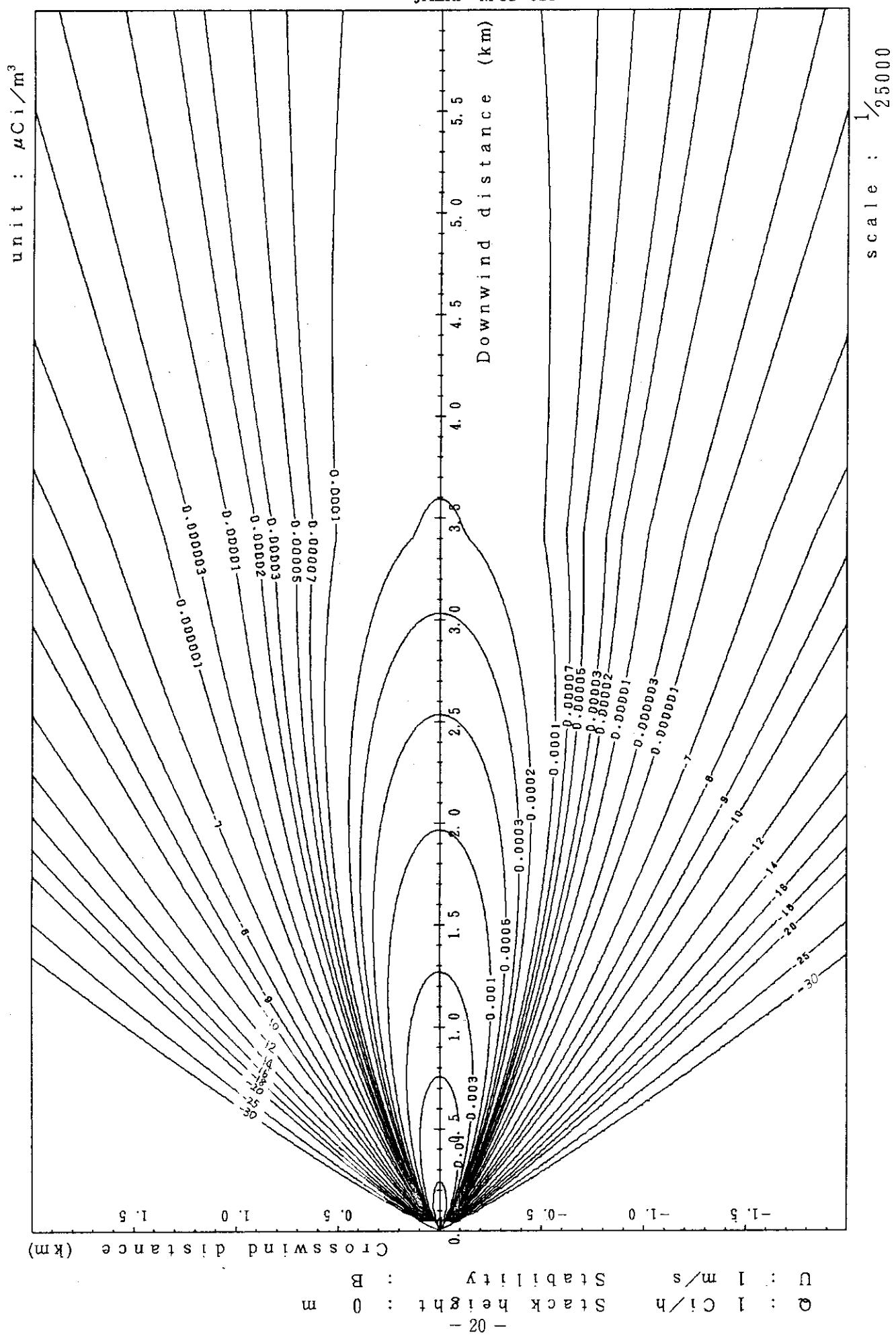


Fig. 2-1-2 (A) Isopleths of surface concentration

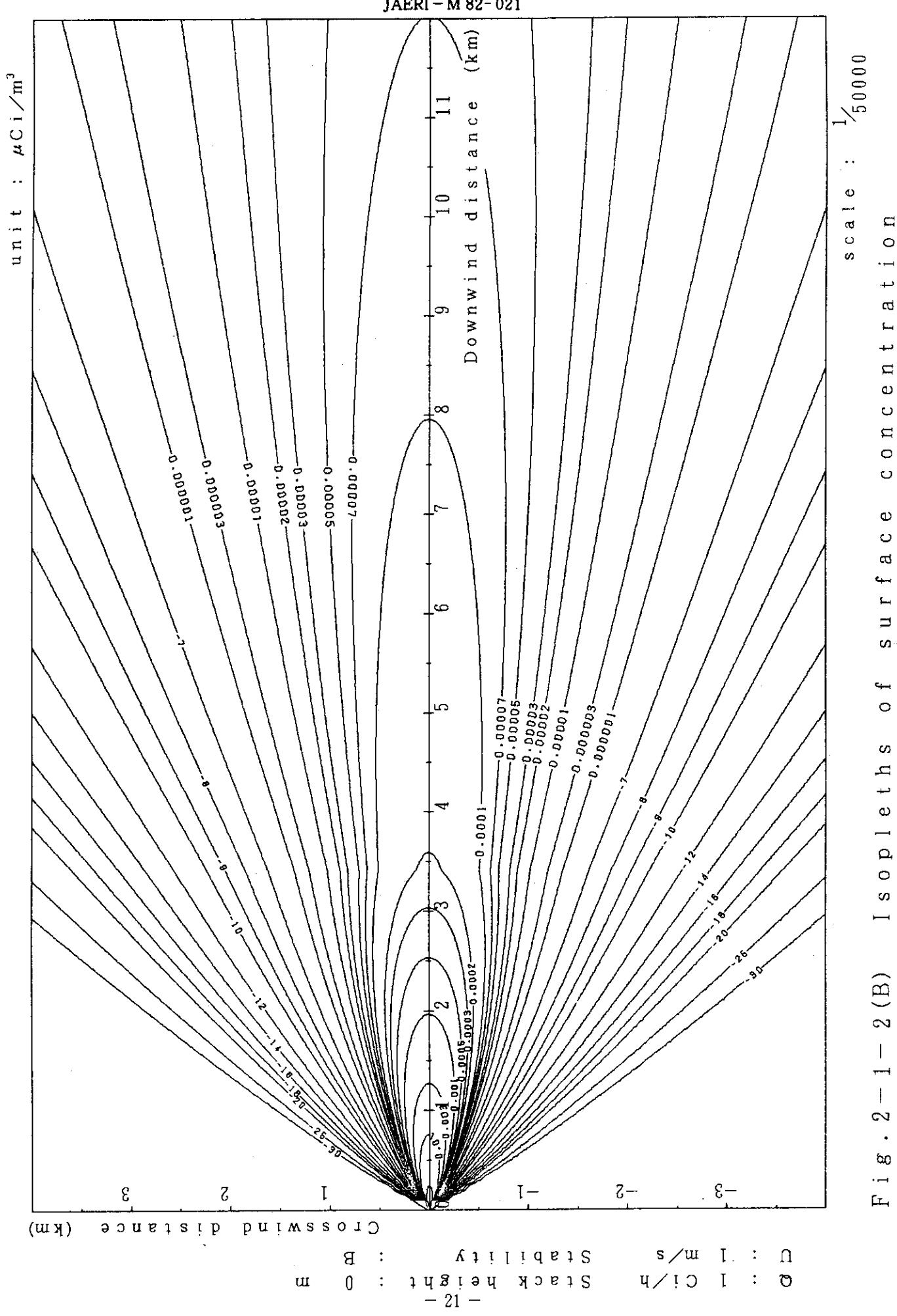


Fig. 2-1-2(B) Isopleths of surface concentration

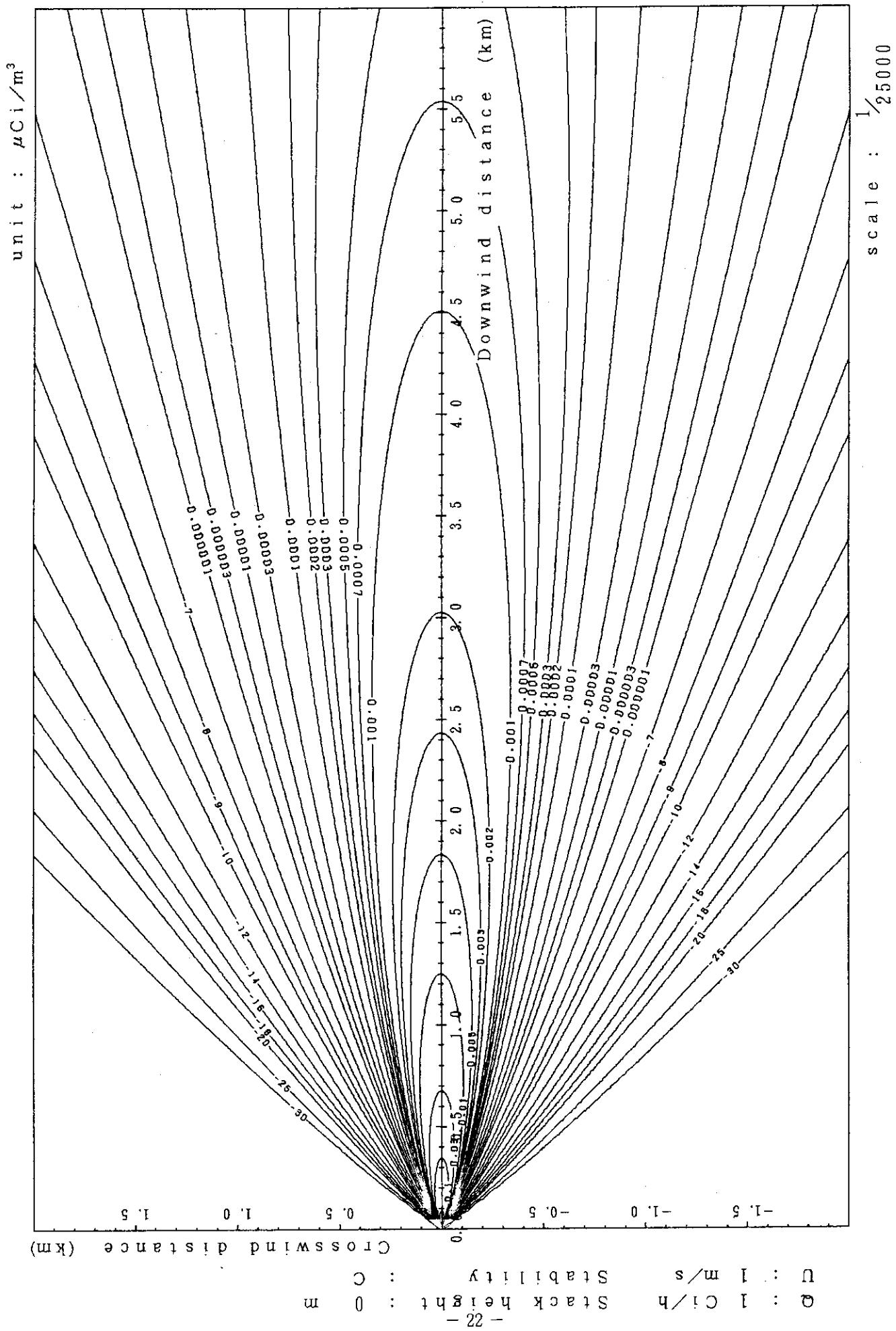


Fig. 2-1-3 (A) Isopleths of surface concentration

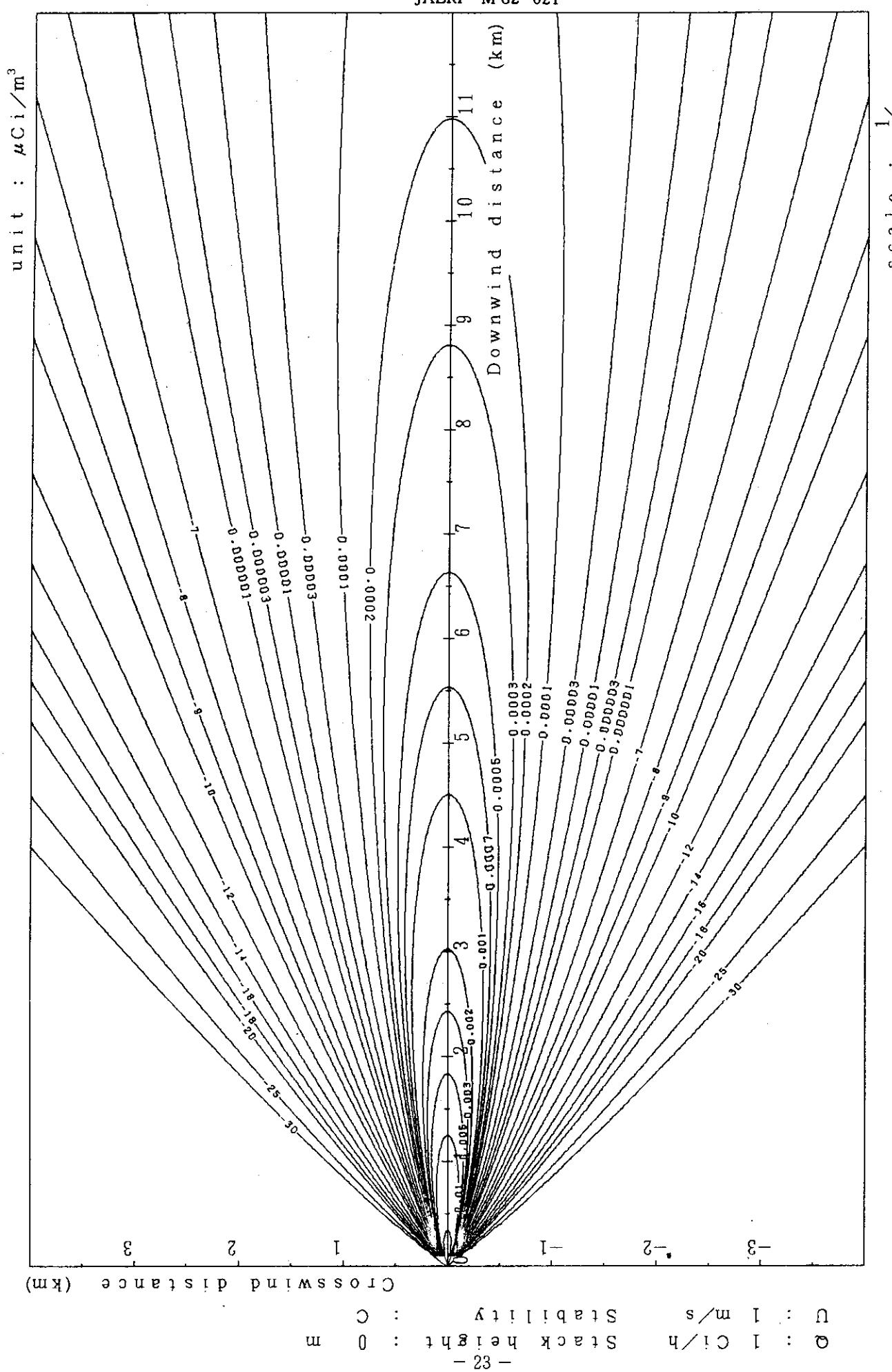


Fig. 2-1-3(B) Isopleths of surface concentration

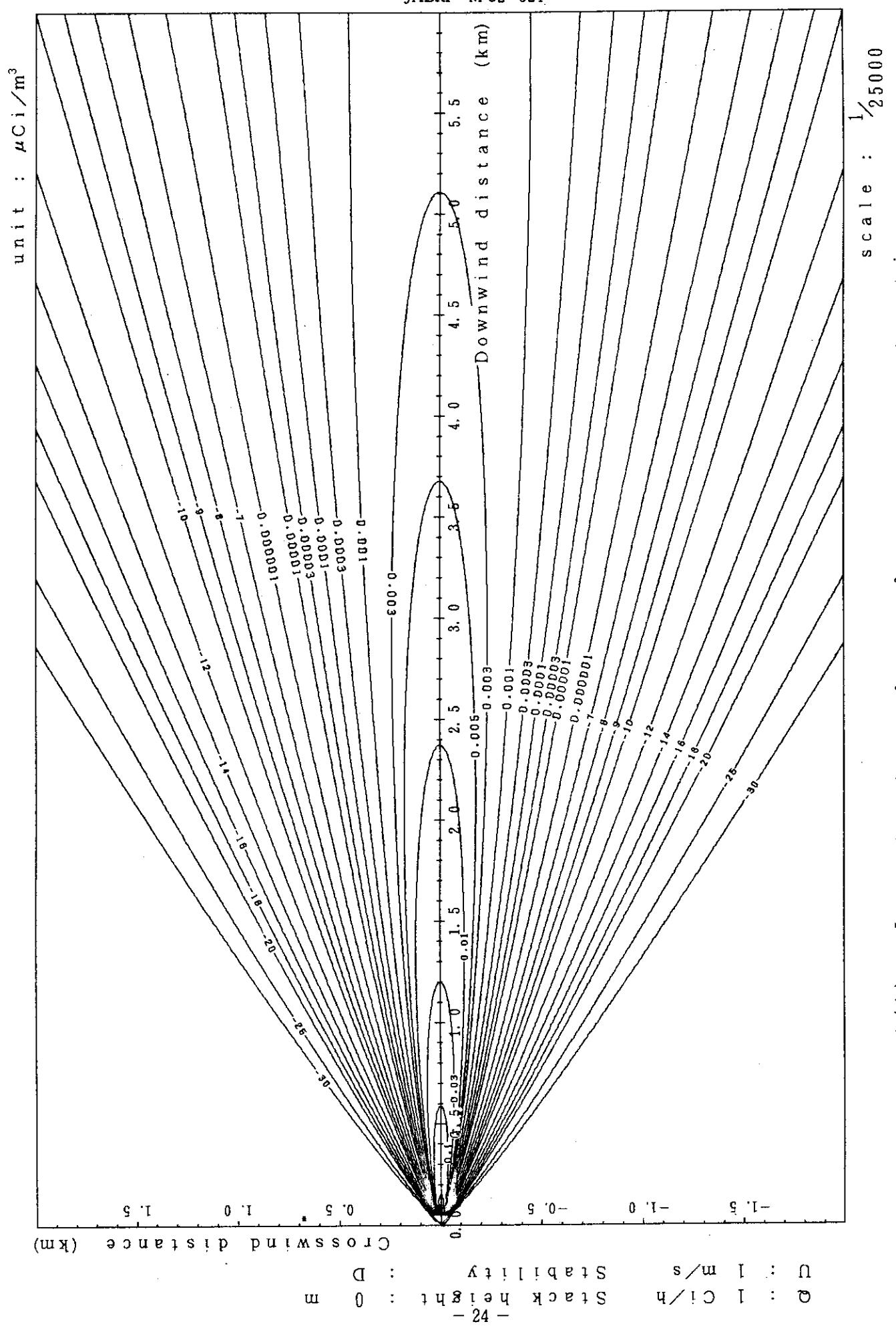


Fig. 2-1-4 (A) Isopleths of surface concentration

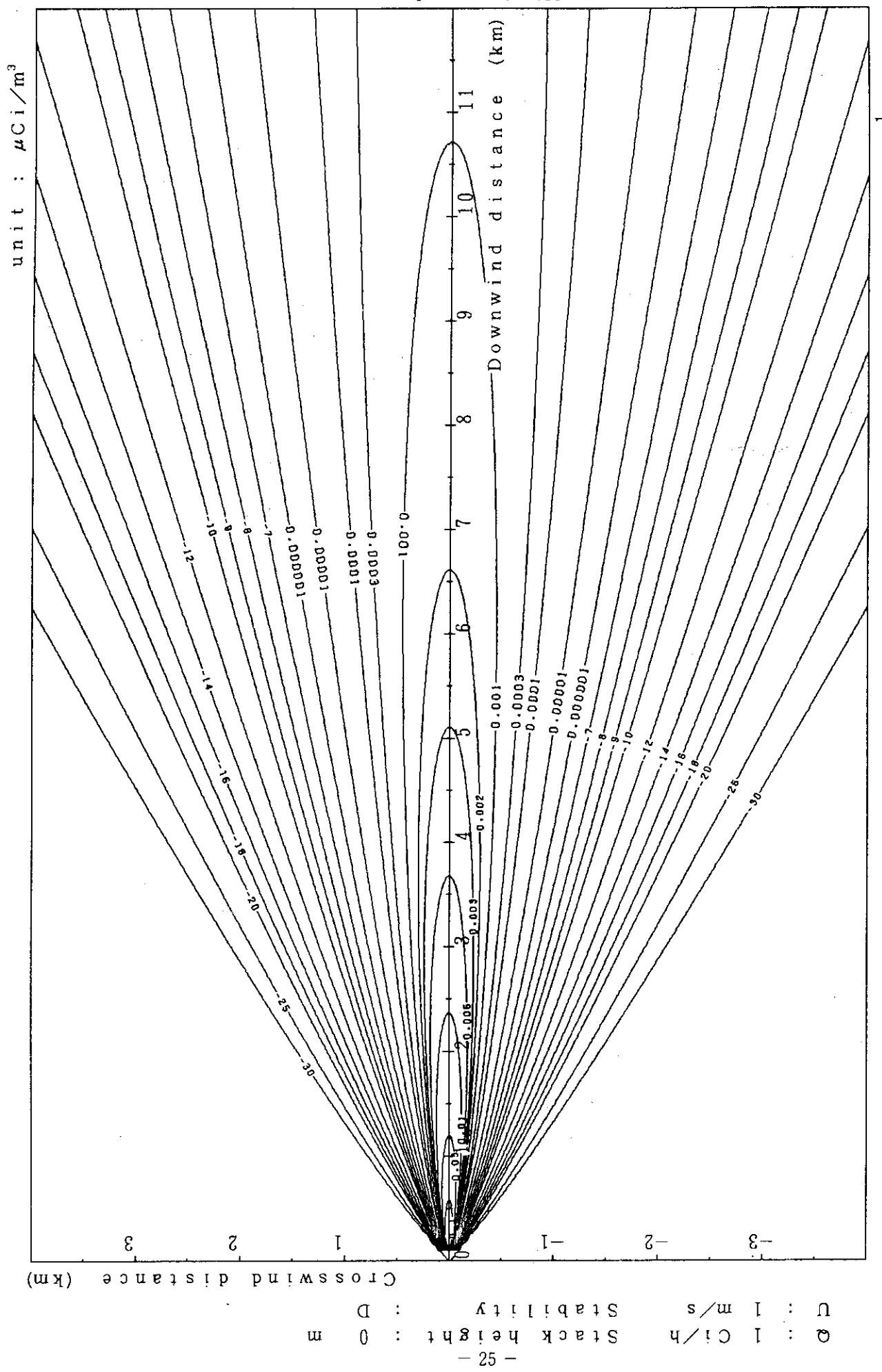


Fig. 2-1-4 (B) Isopleths of surface concentration

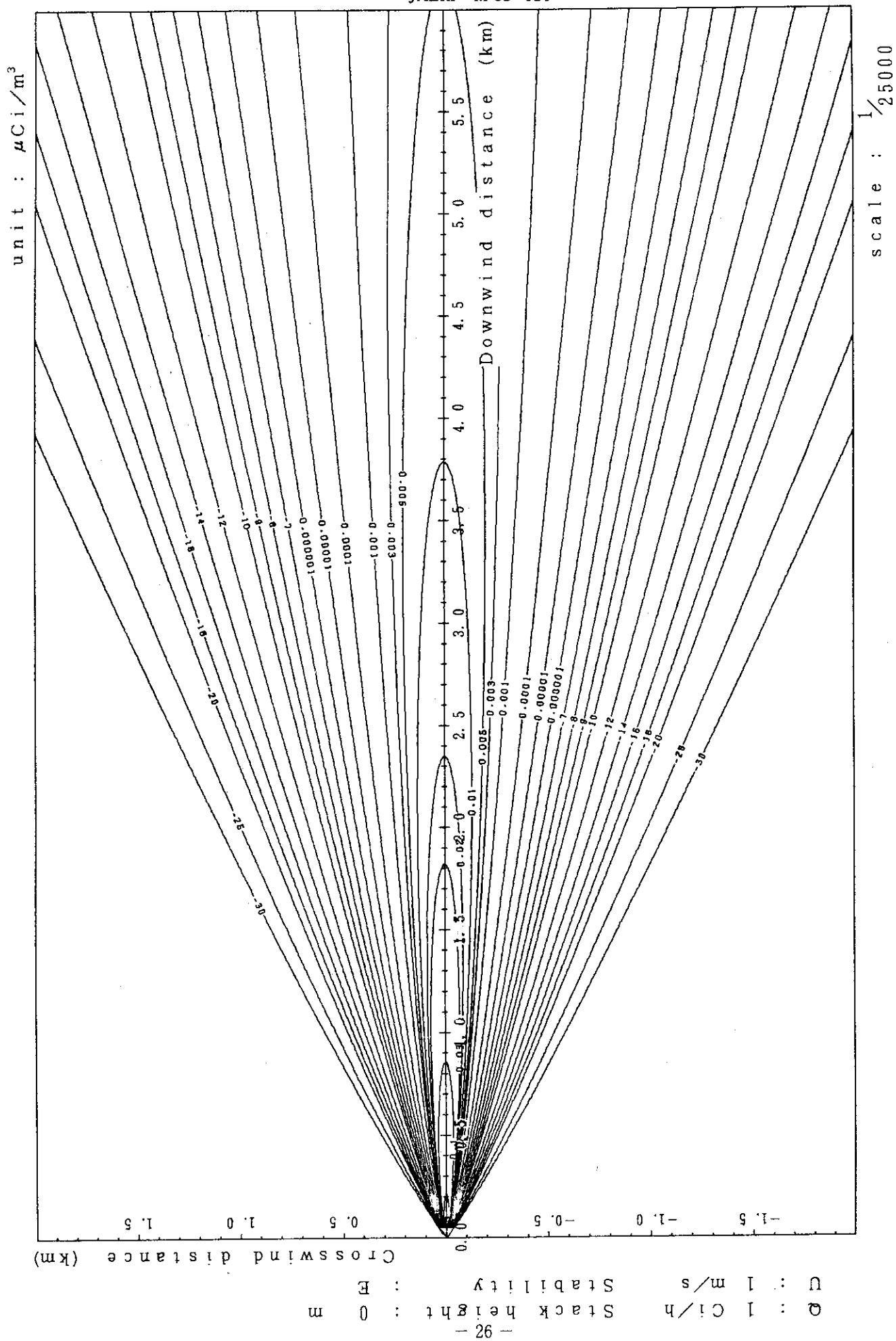


Fig. 2-1-5 (A) Isopleths of surface concentration

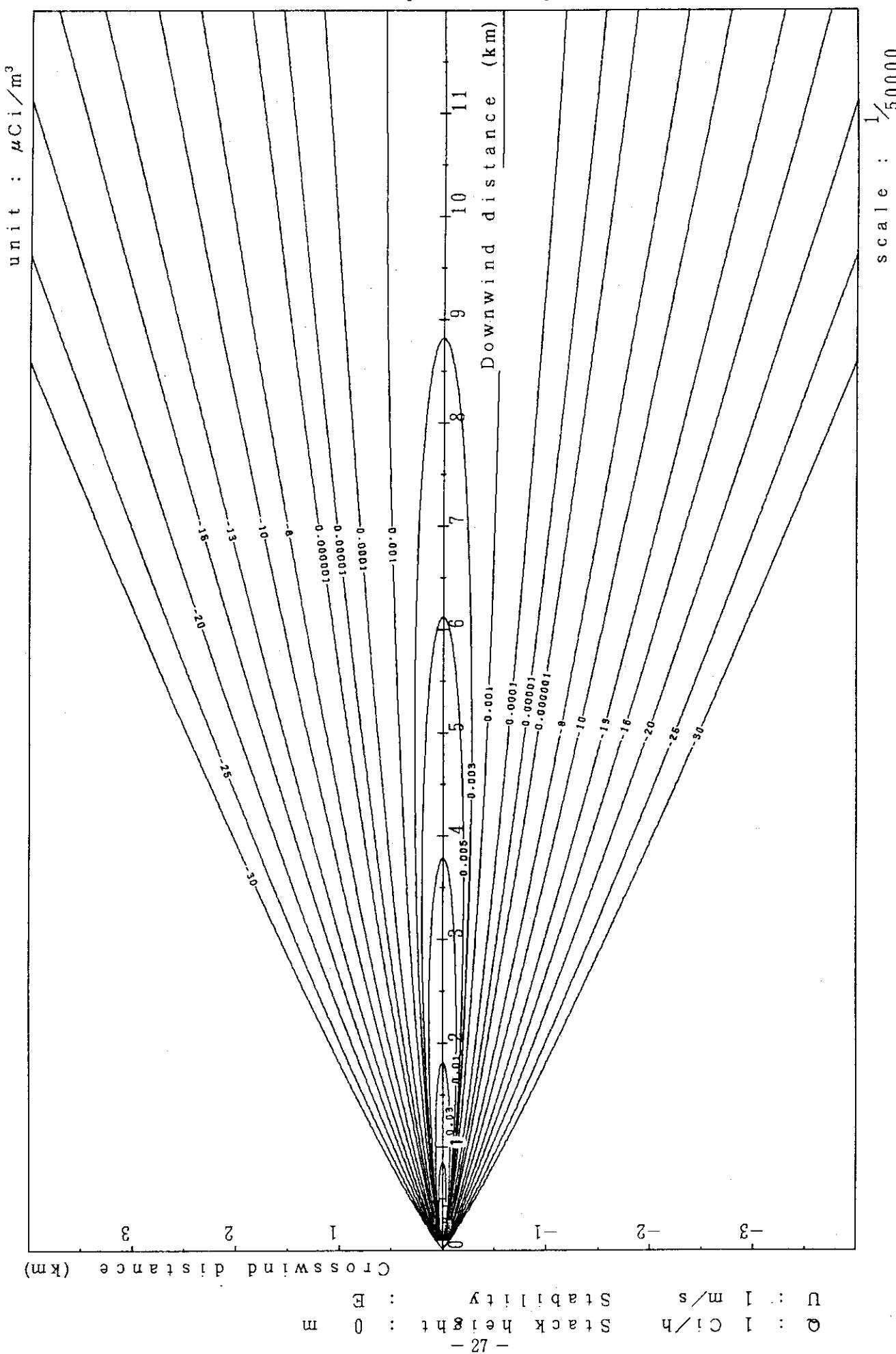


Fig. 2-1-5(B) Isopleths of surface concentration

scale : 1/50000

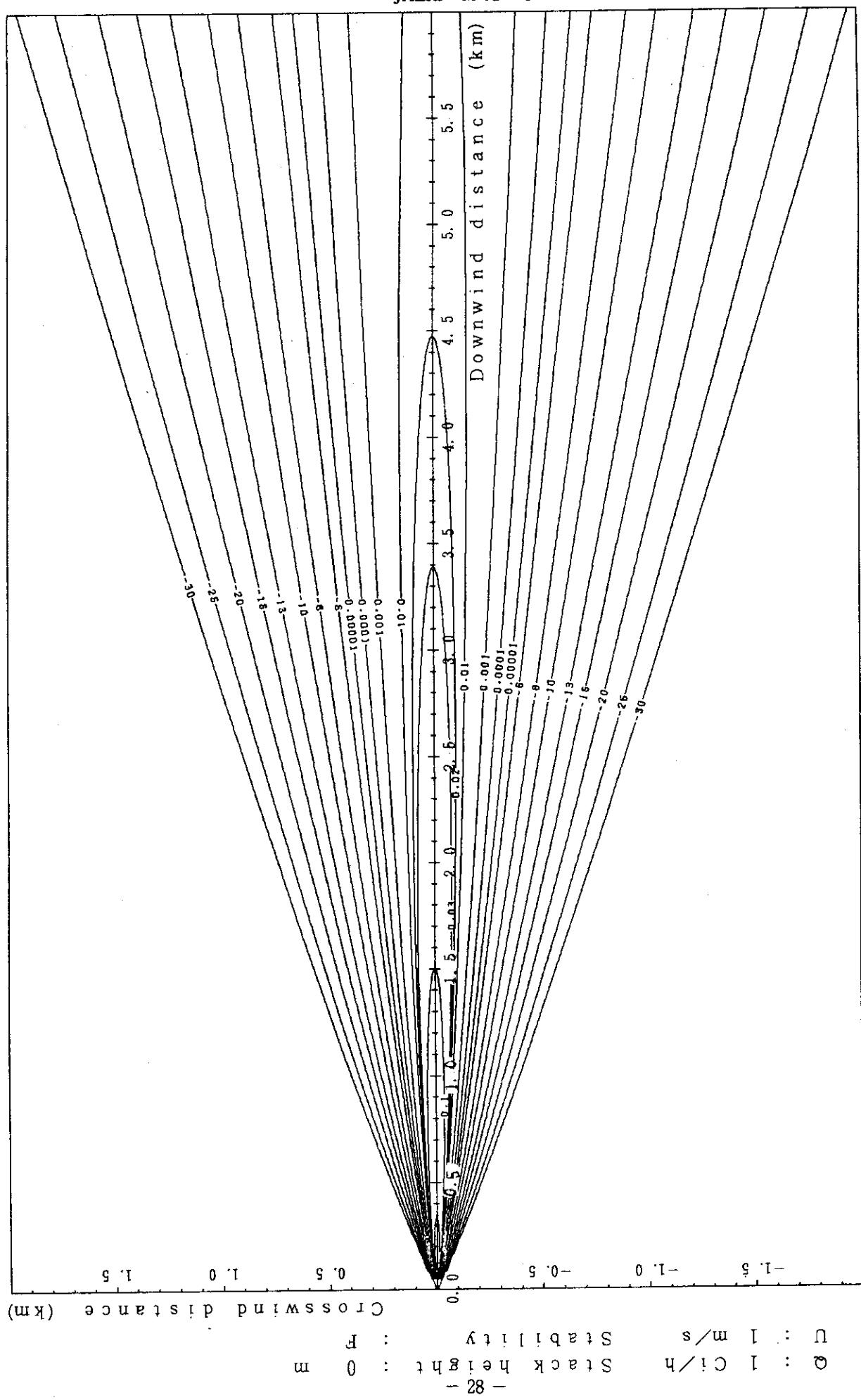
unit :  $\mu\text{Ci}/\text{m}^3$ 

Fig. 2-1-6 (A) Isopleths of surface concentration

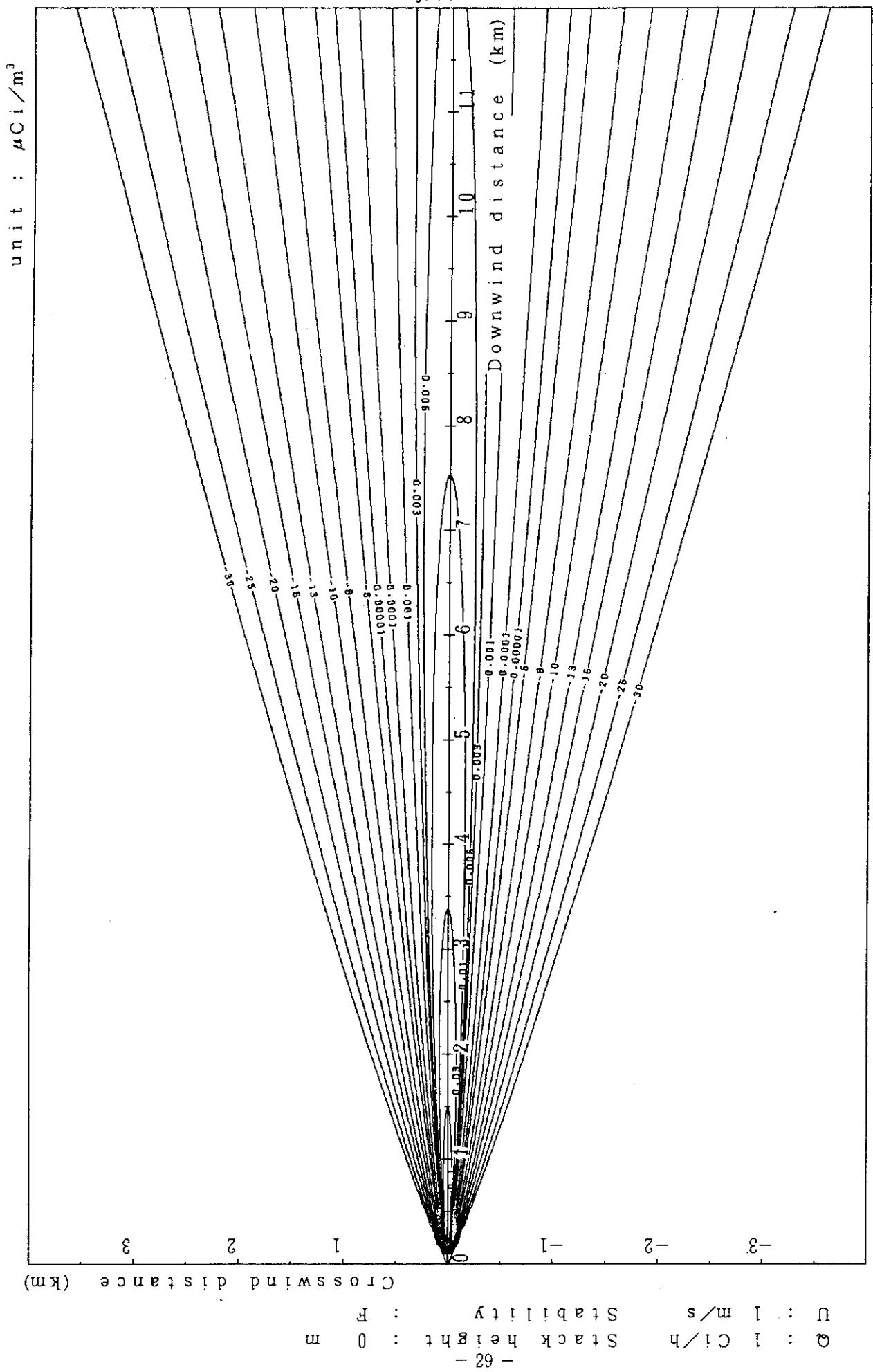


Fig. 2-1-6 (B) Isopleths of surface concentration

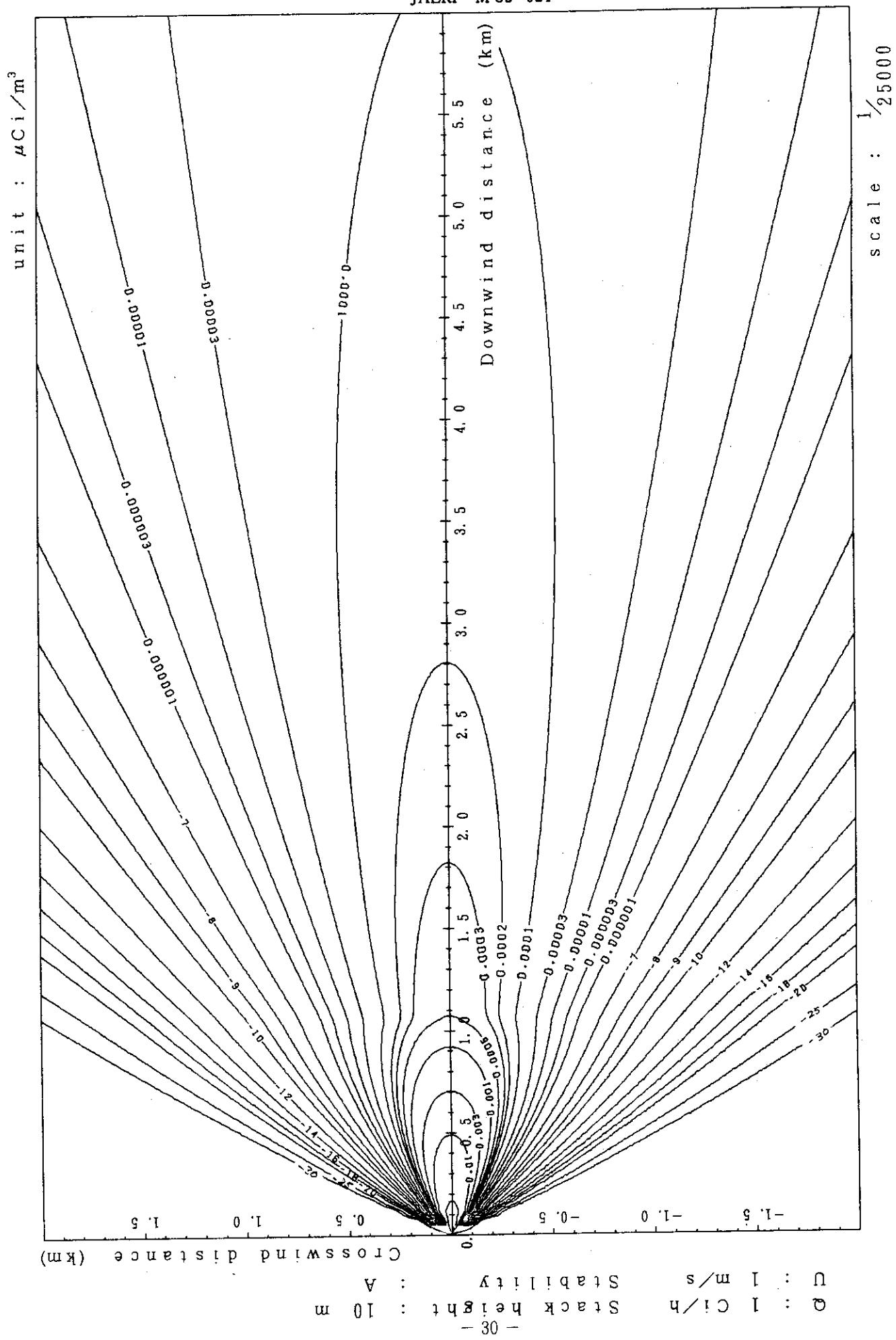


Fig. 2-2-1(A) Isopleths of surface concentration

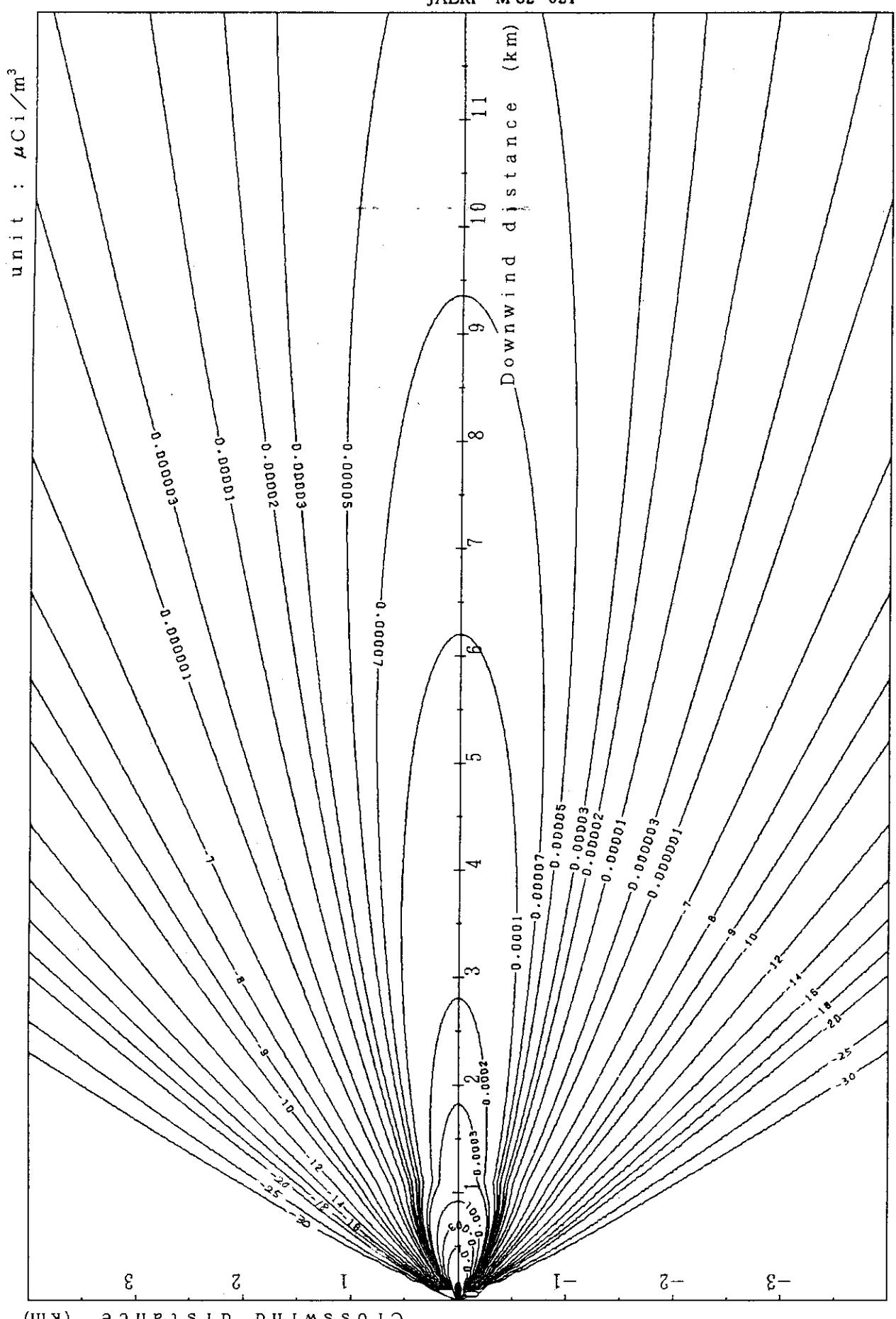
scale :  $1/50000$ 

Fig. 2-2-1(B) Isopleths of surface concentration

$Q : 1 \text{ Ci/h}$  Stack height : 10 m  
 $U : 1 \text{ m/s}$  Stability : A

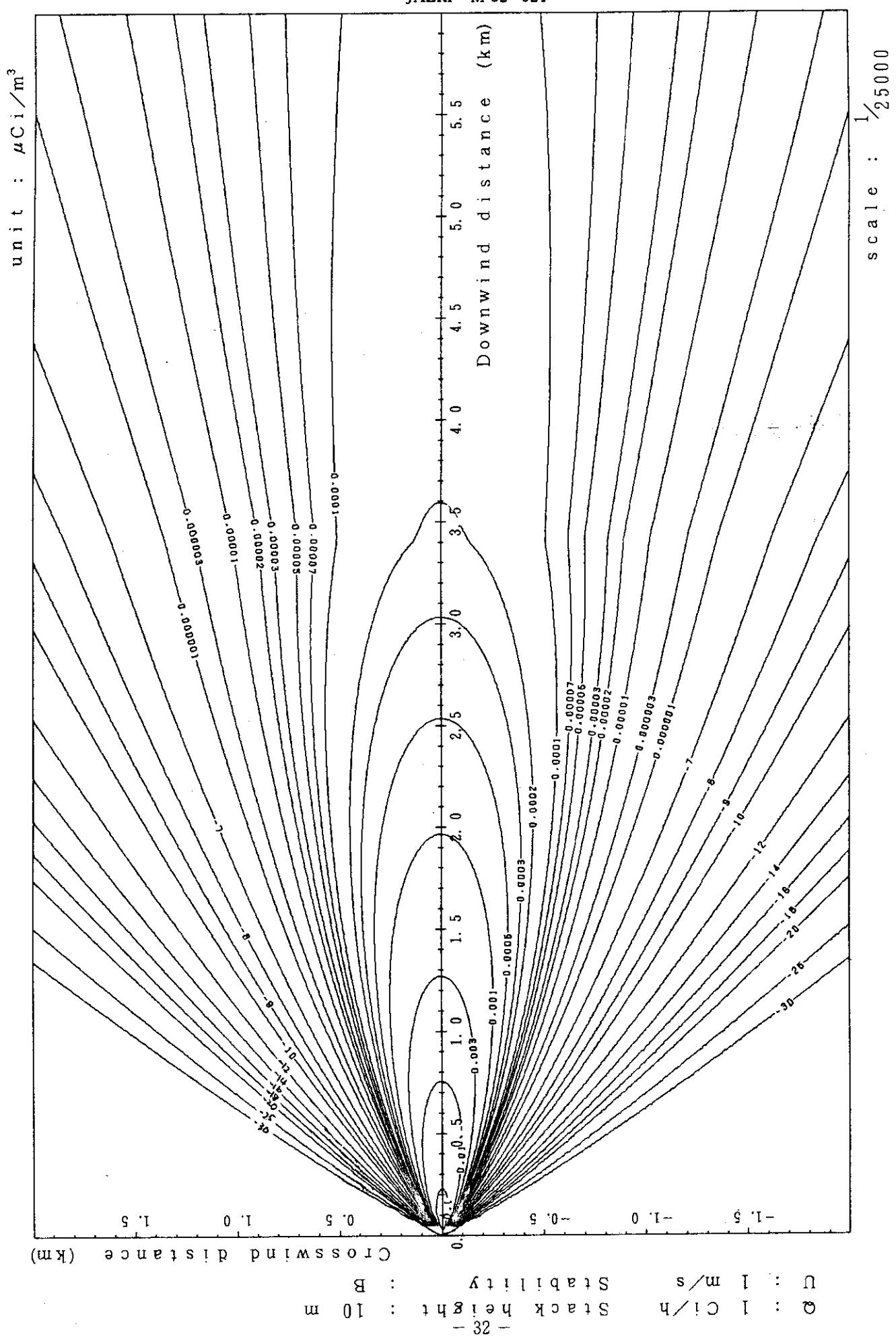


Fig. 2-2-2 (A) Isopleths of surface concentration

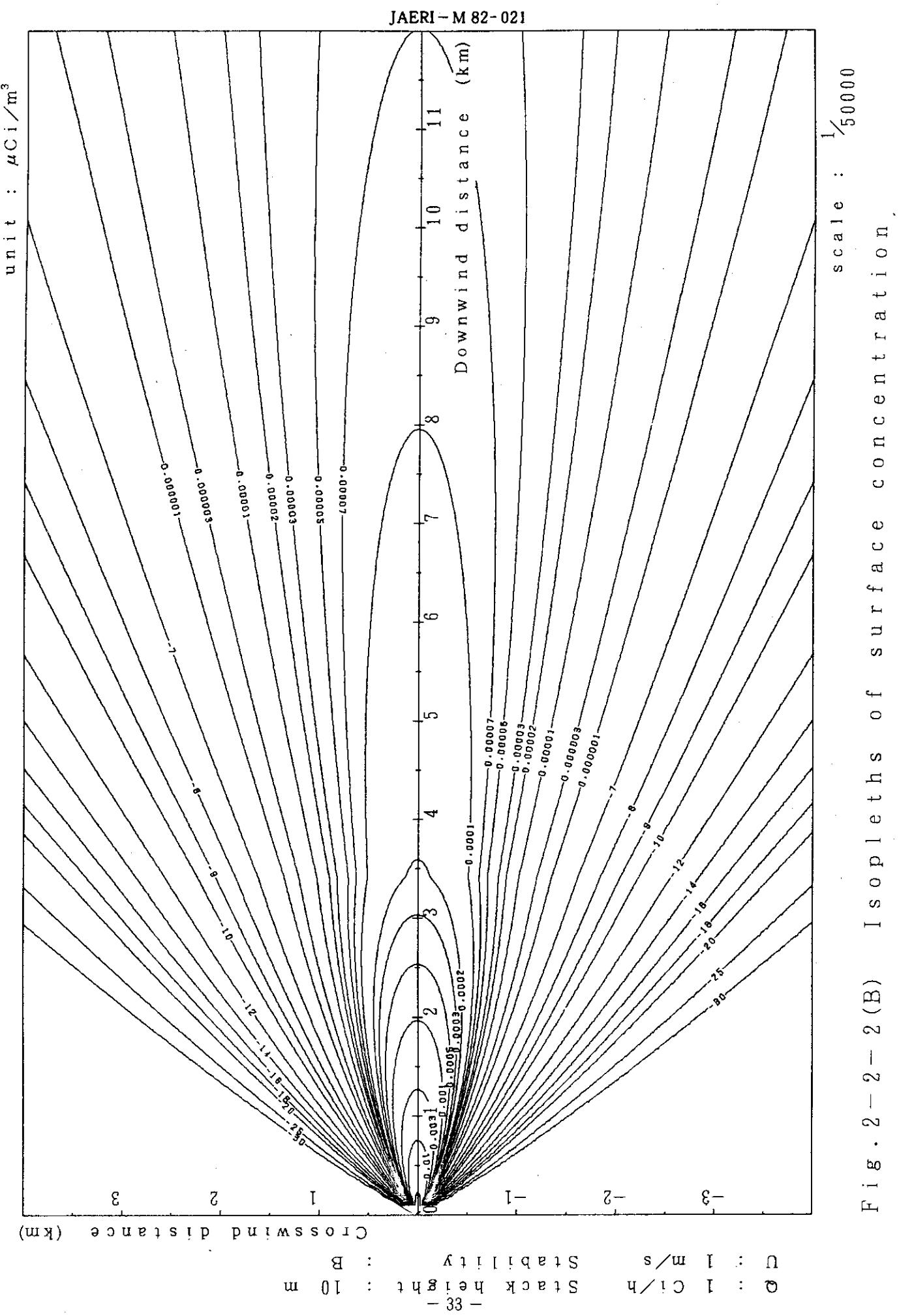


Fig. 2-2-2 (B) Isopleths of surface concentration.

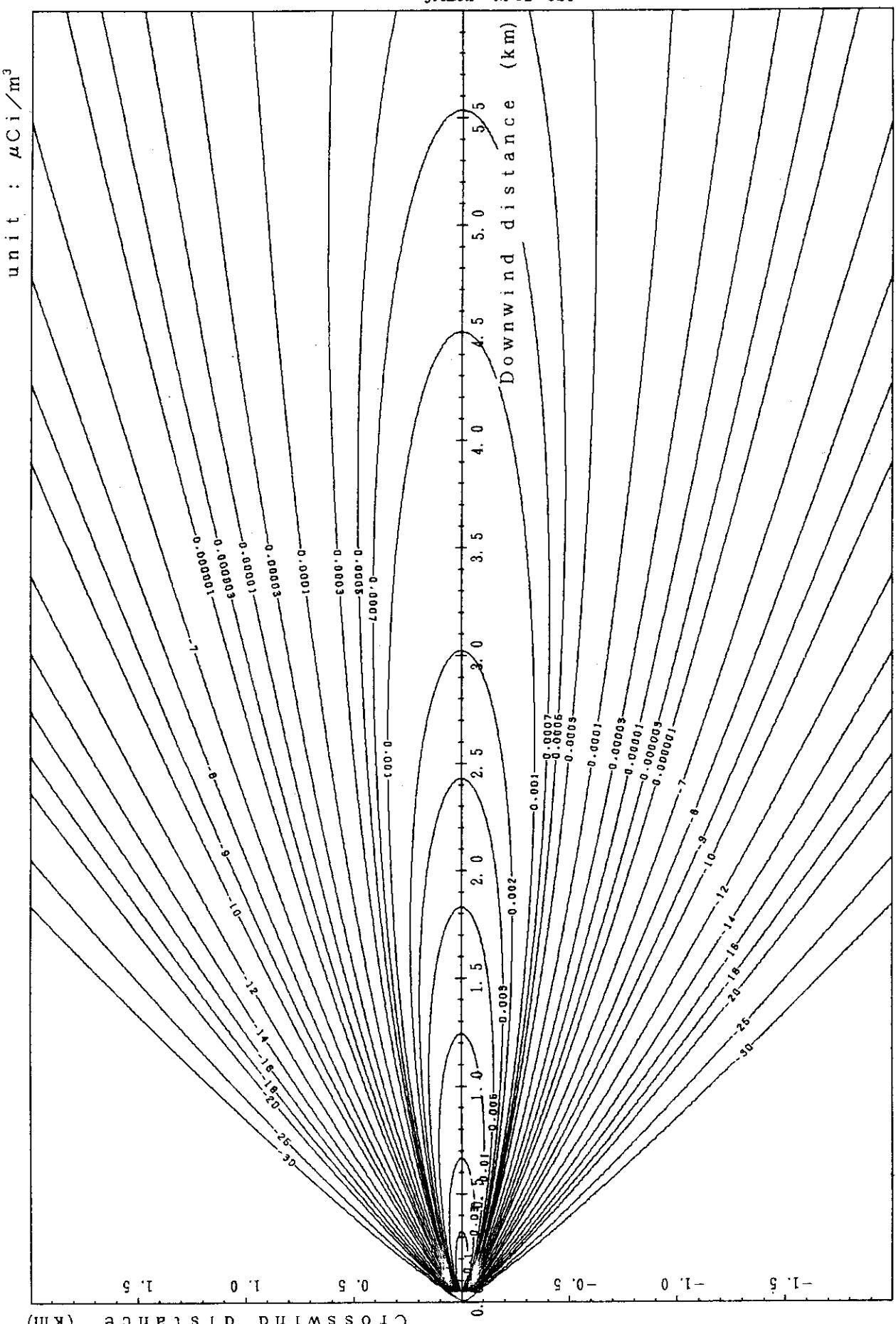


Fig. 2-2-3 (A) Isopleths of surface concentration  
scale :  $1/25000$

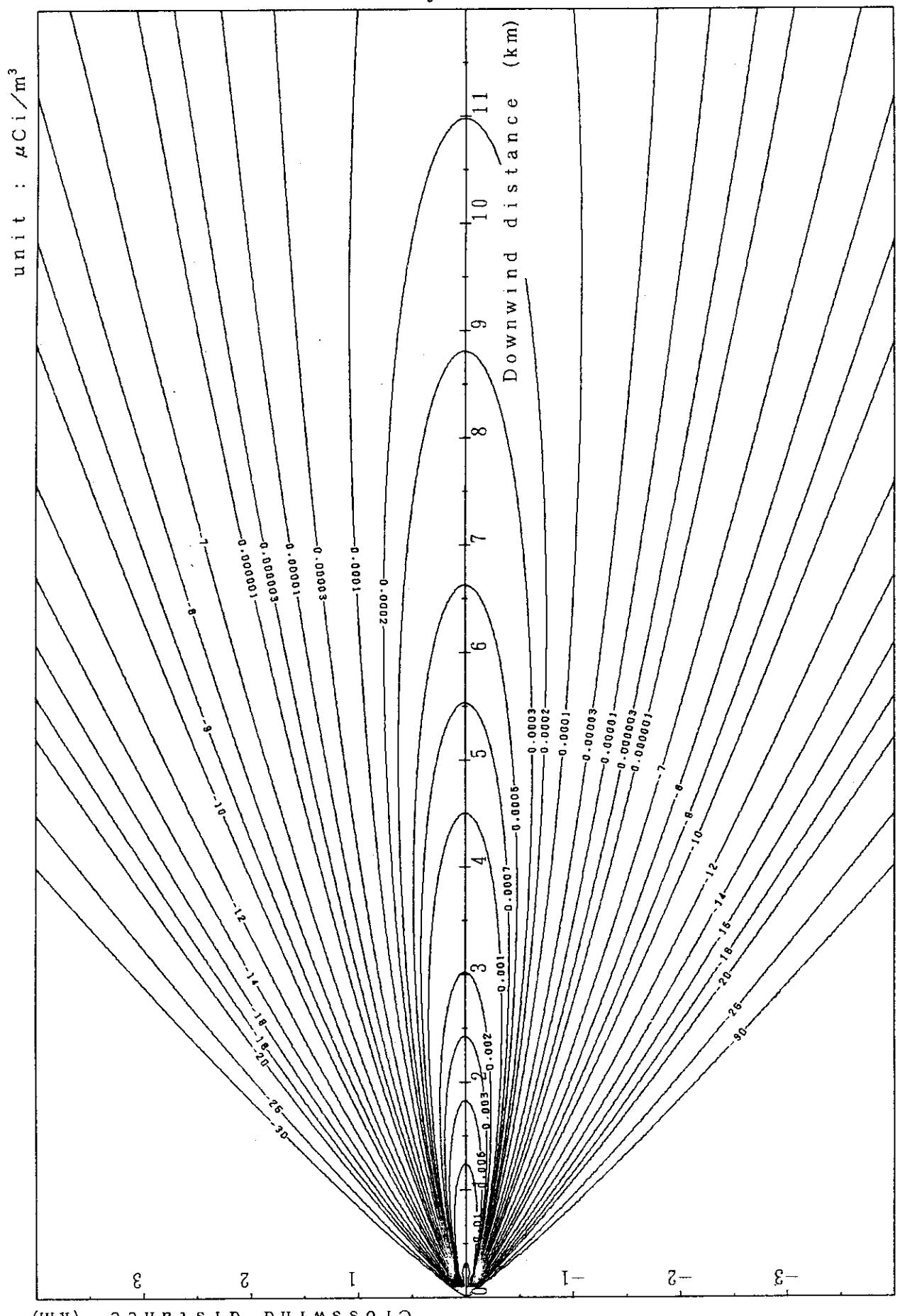


Fig. 2-2-3(B) Isopleths of surface concentration

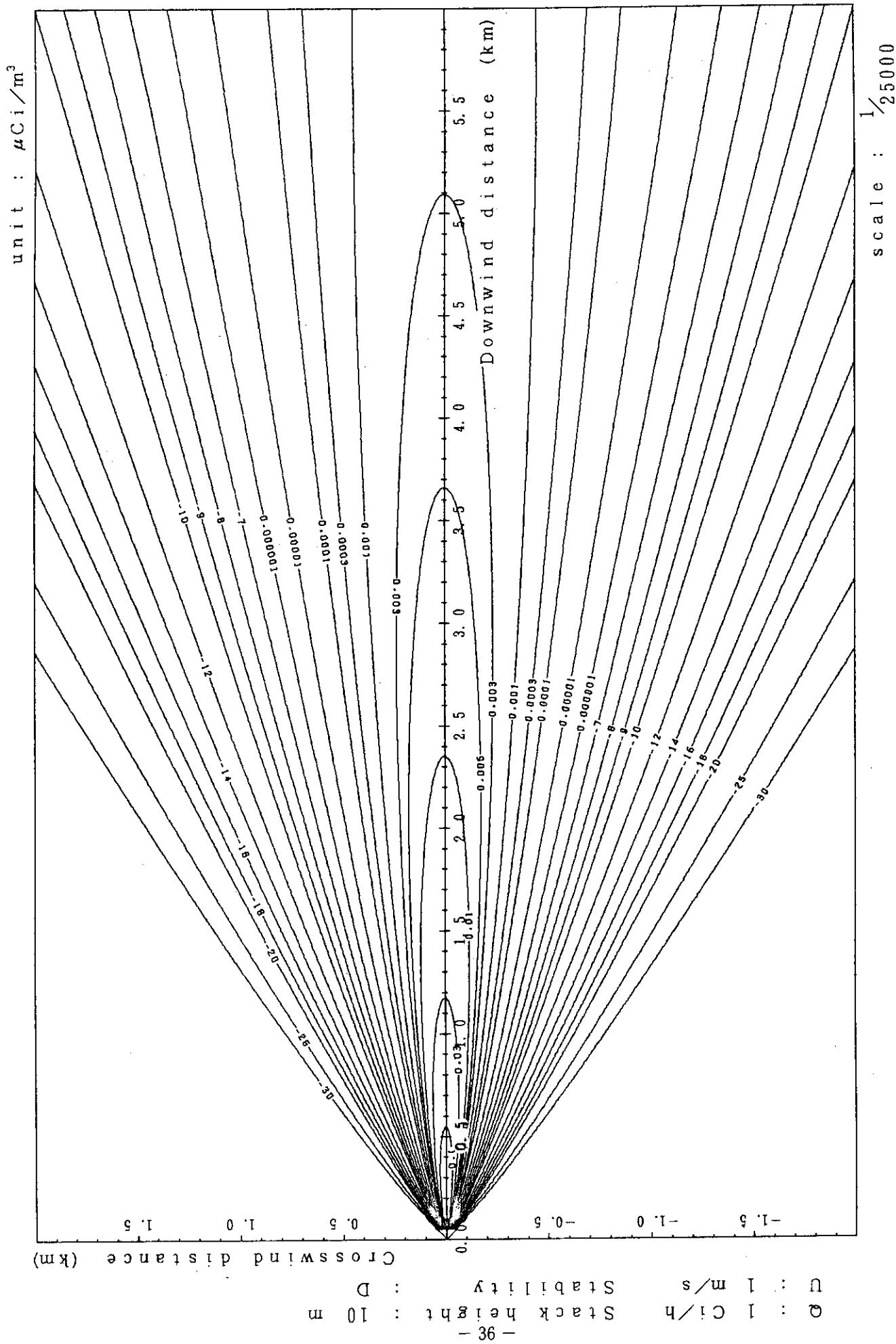


Fig. 2-2-4 (A) Isopleths of surface concentration

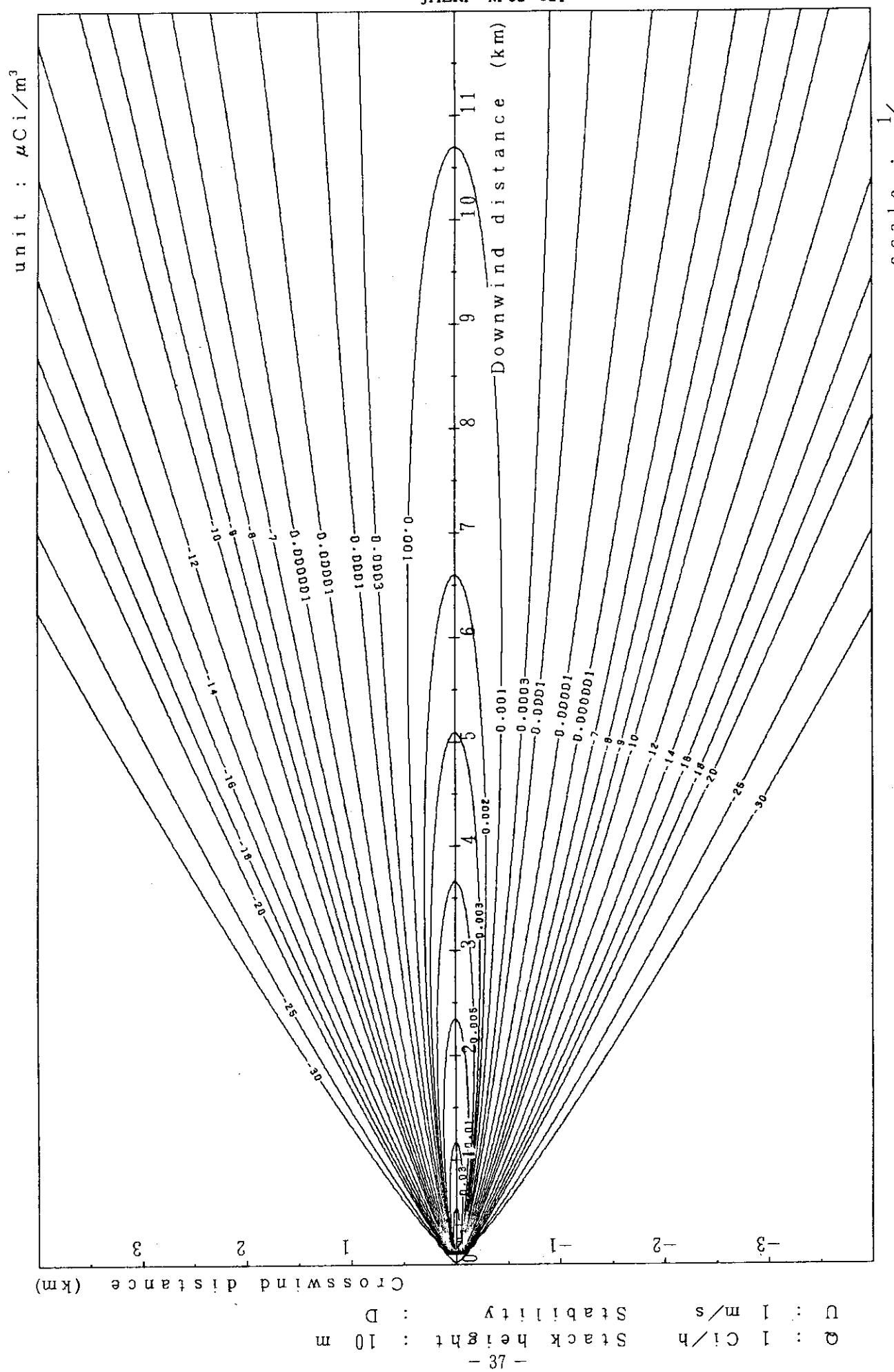


Fig. 2-2-4 (B) Isopleths of surface concentration

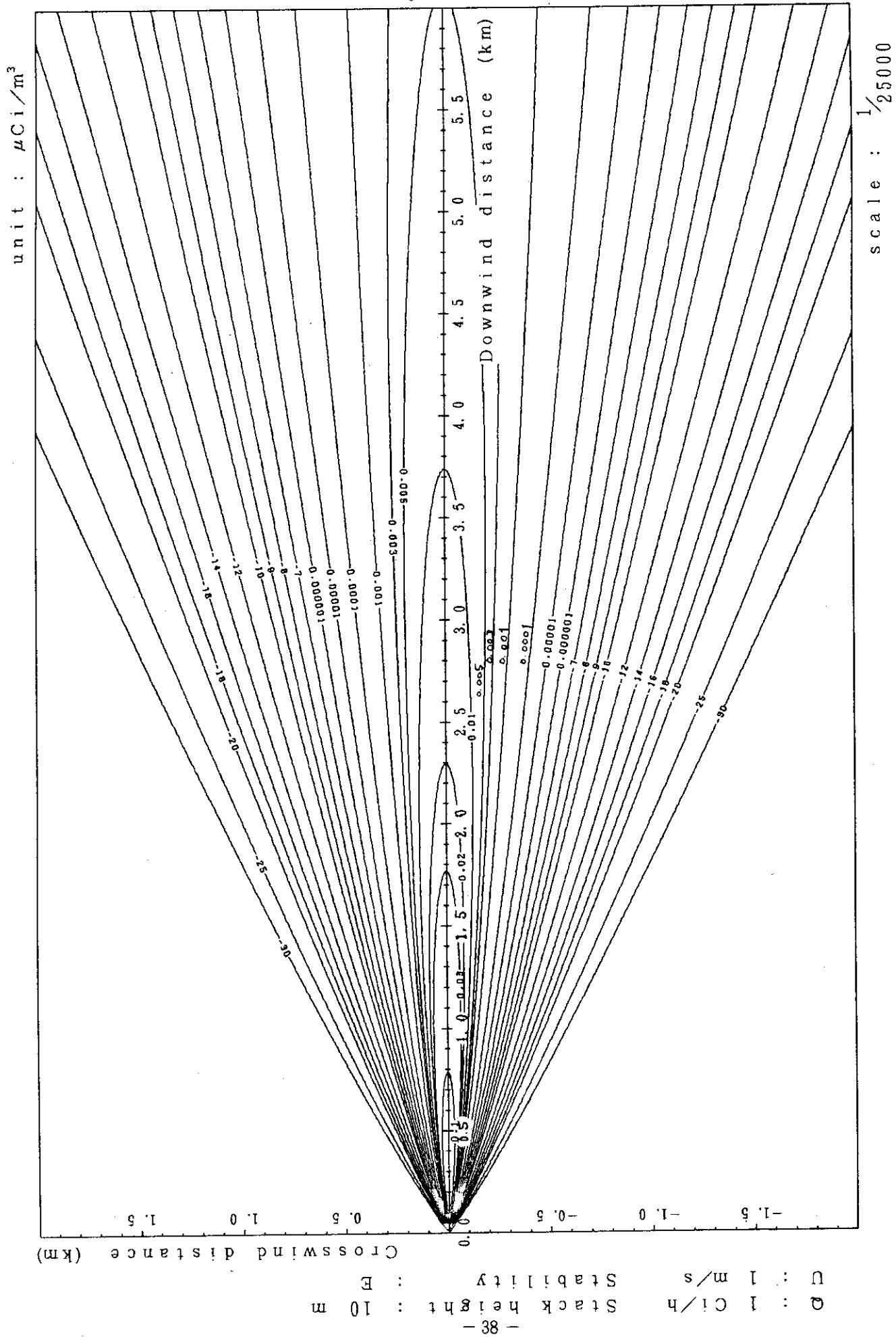


Fig. 2-2-5 (A) Isopleths of surface concentration

JAERI - M 82-021

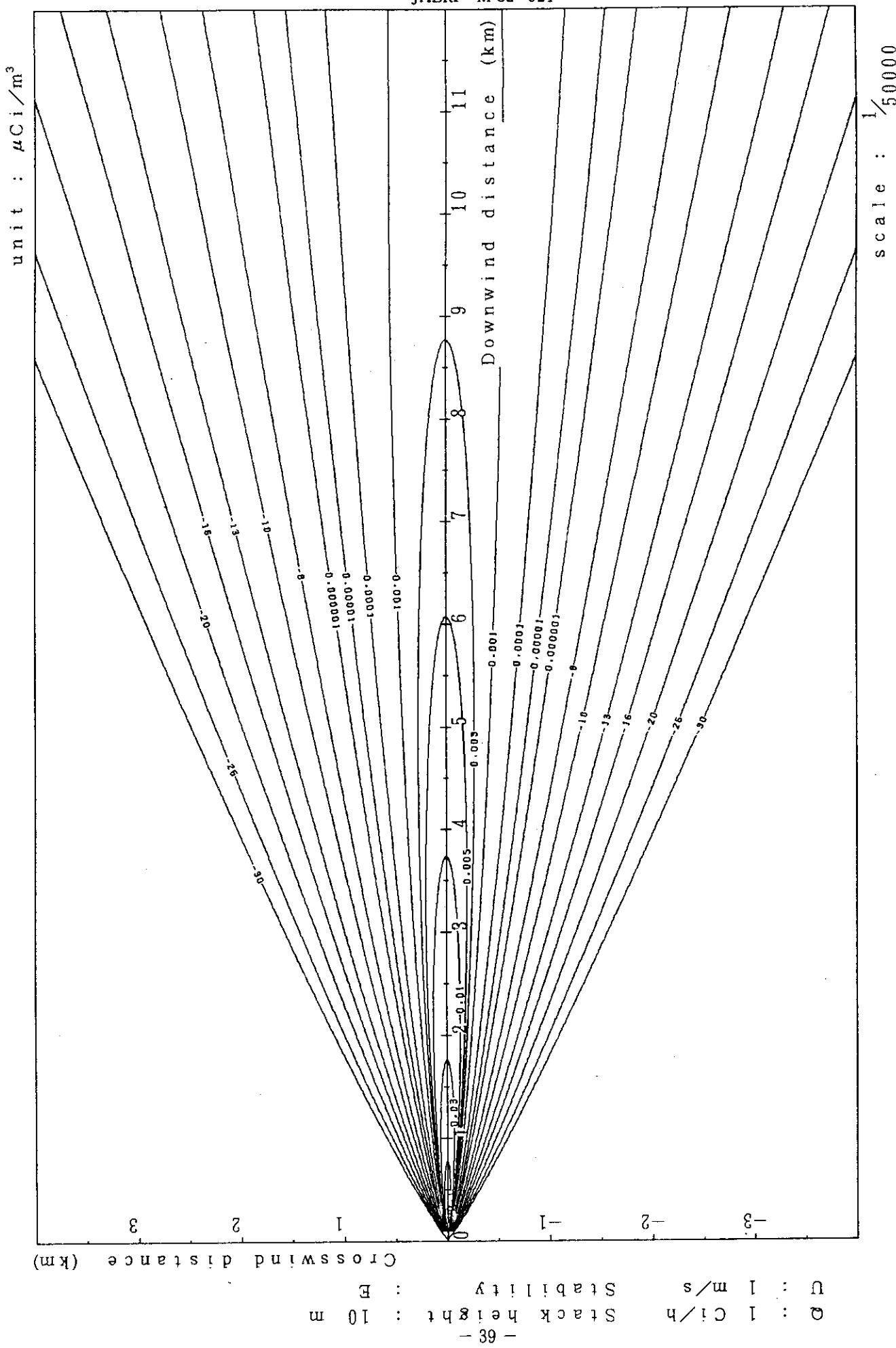


Fig. 2-2-5 (B) Isopleths of surface concentration

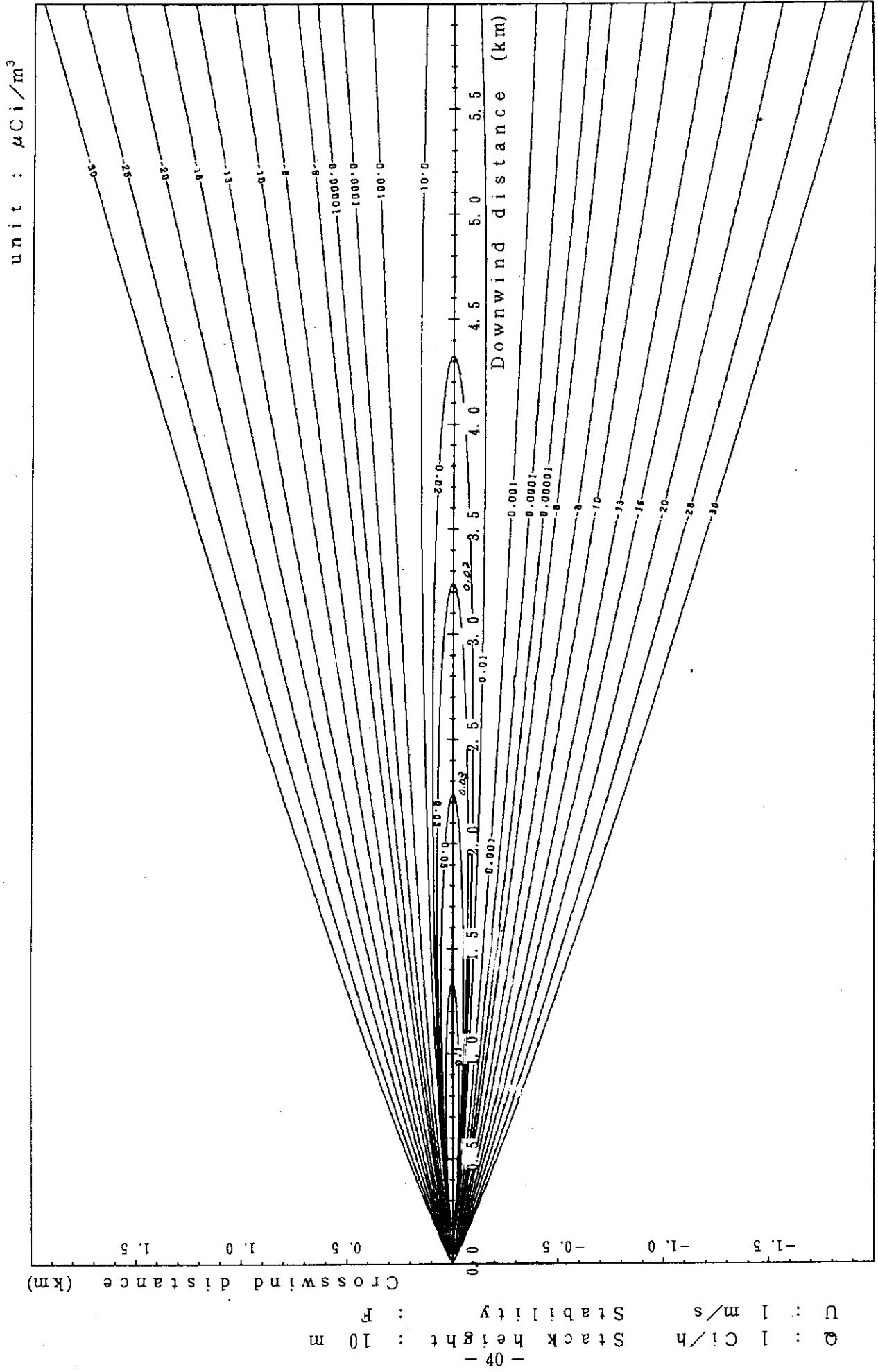


Fig. 2-2-6(A) Isopleths of surface concentration  
scale :  $1/25000$

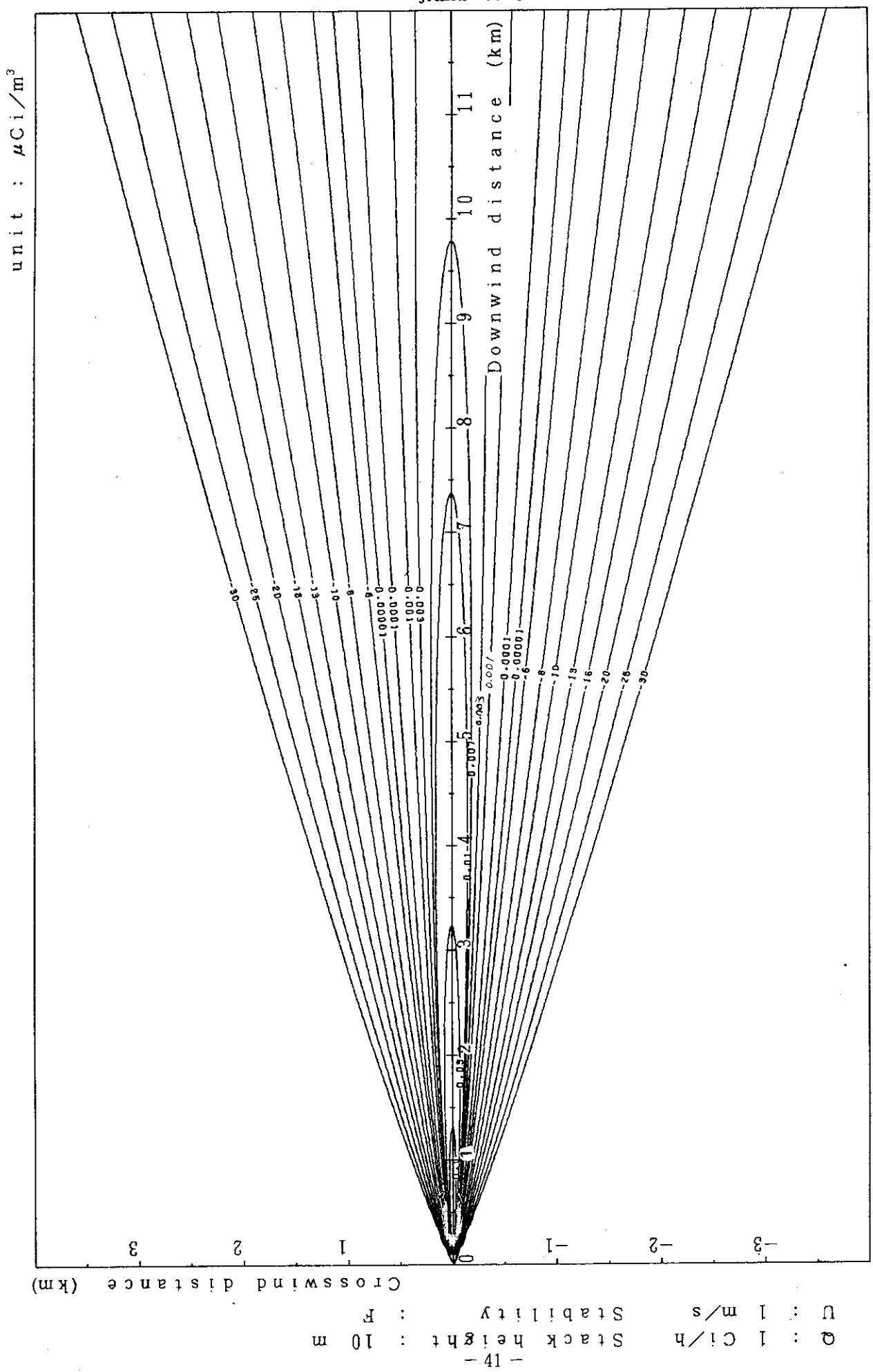


Fig. 2-2-6 (B) Isopleths of surface concentration

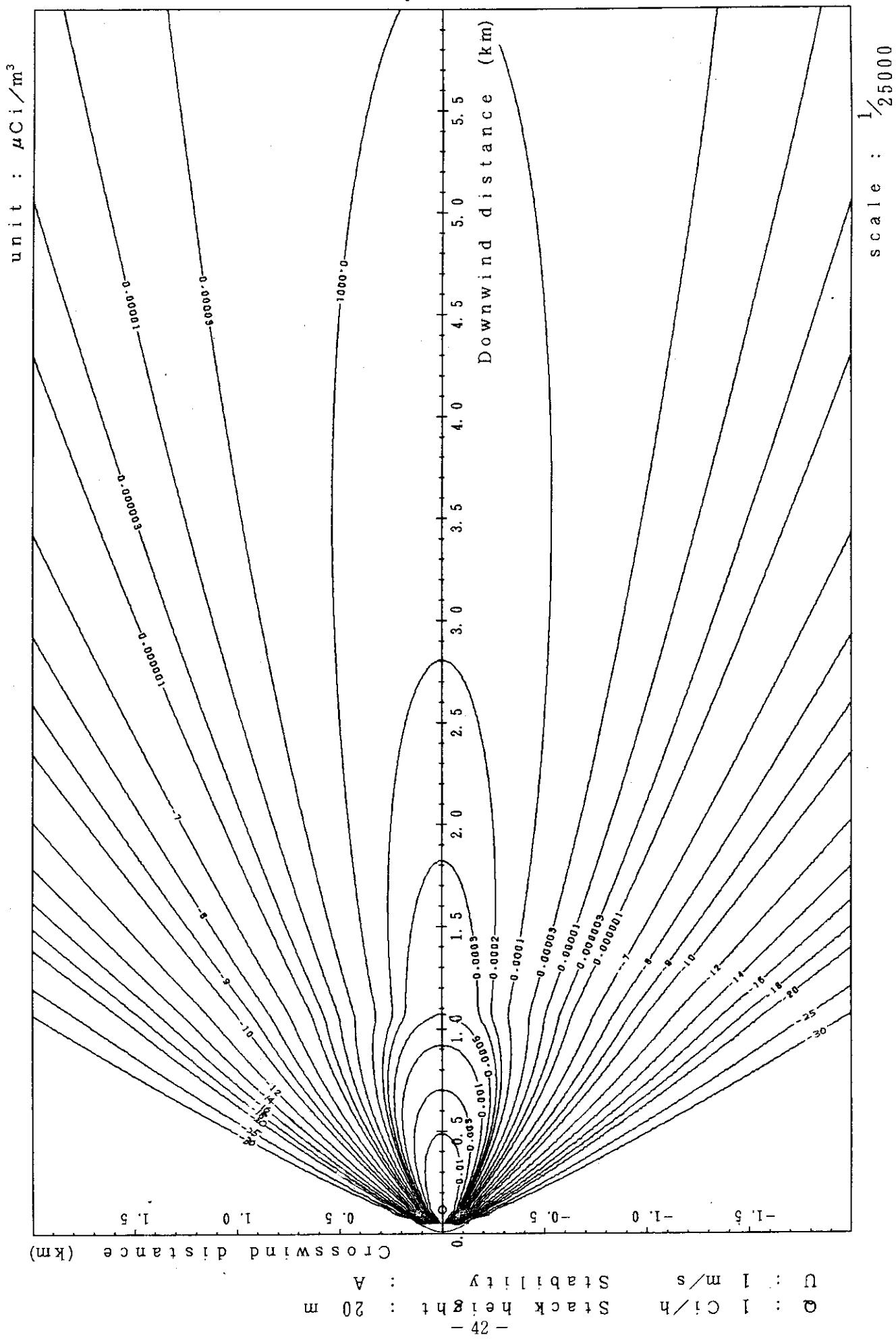


Fig. 2-3-1(A) Isopleths of surface concentration

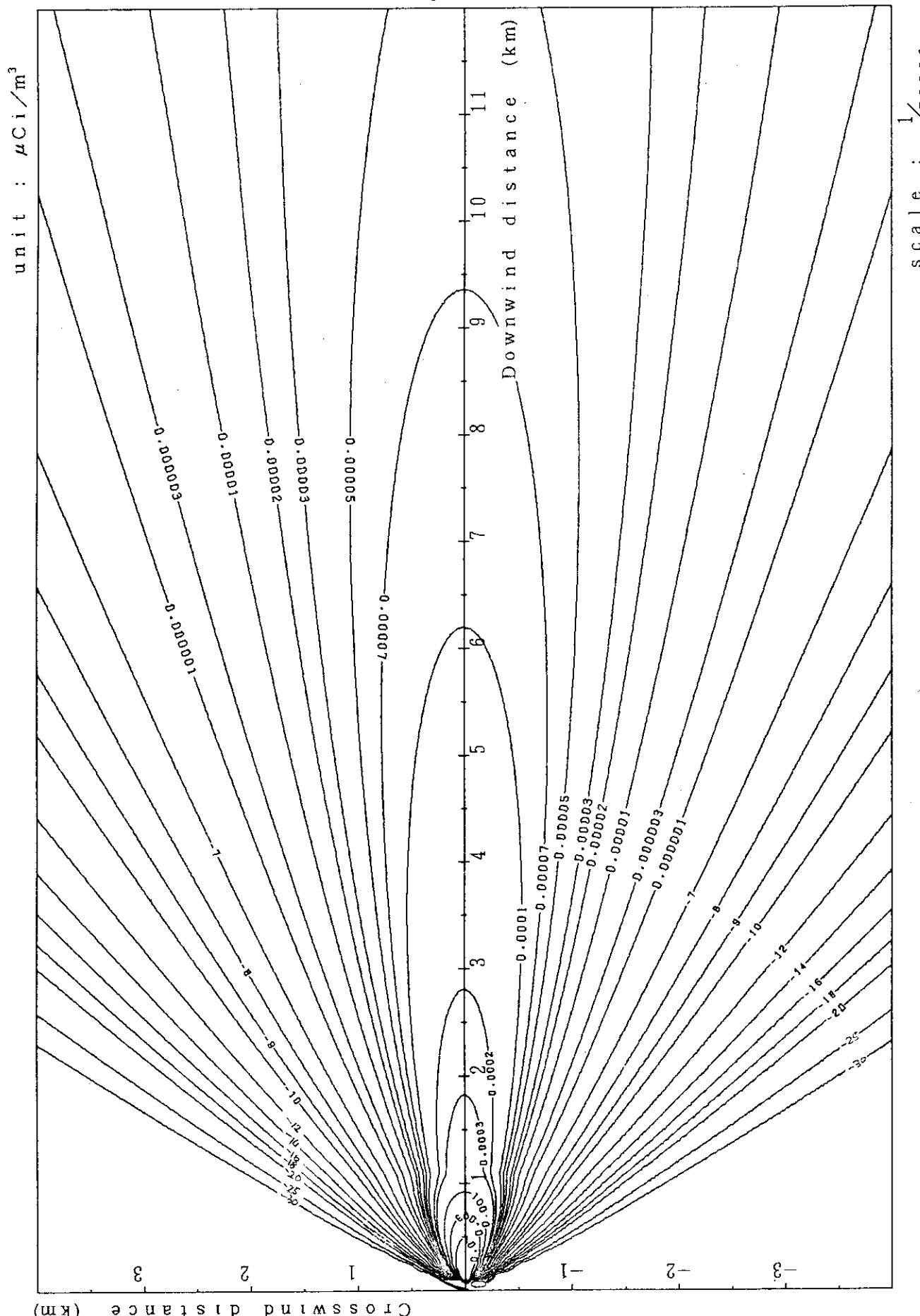


Fig. 2-3-1(B) Isopleths of surface concentration

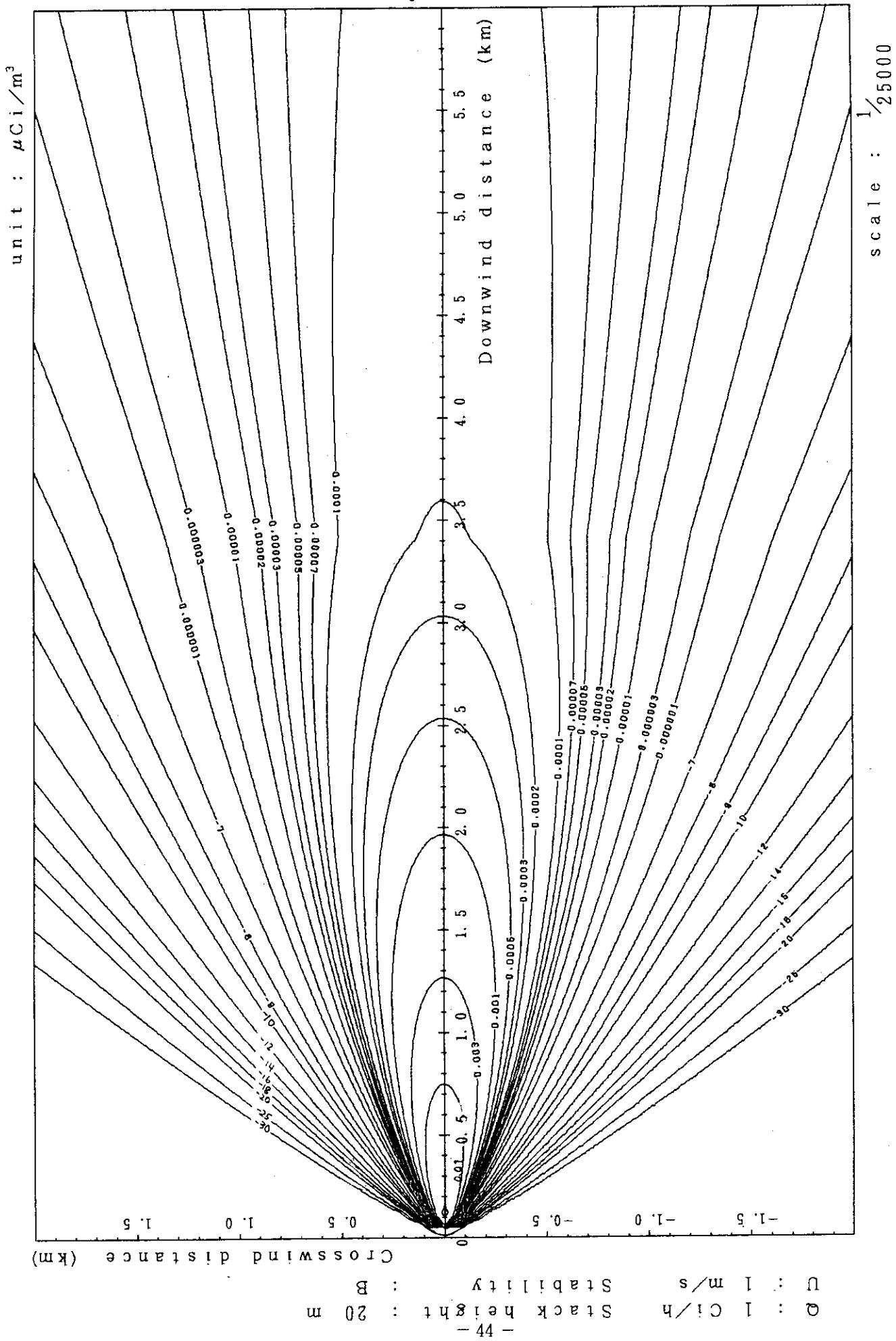


Fig. 2-3-2 (A) Isopleths of surface concentration

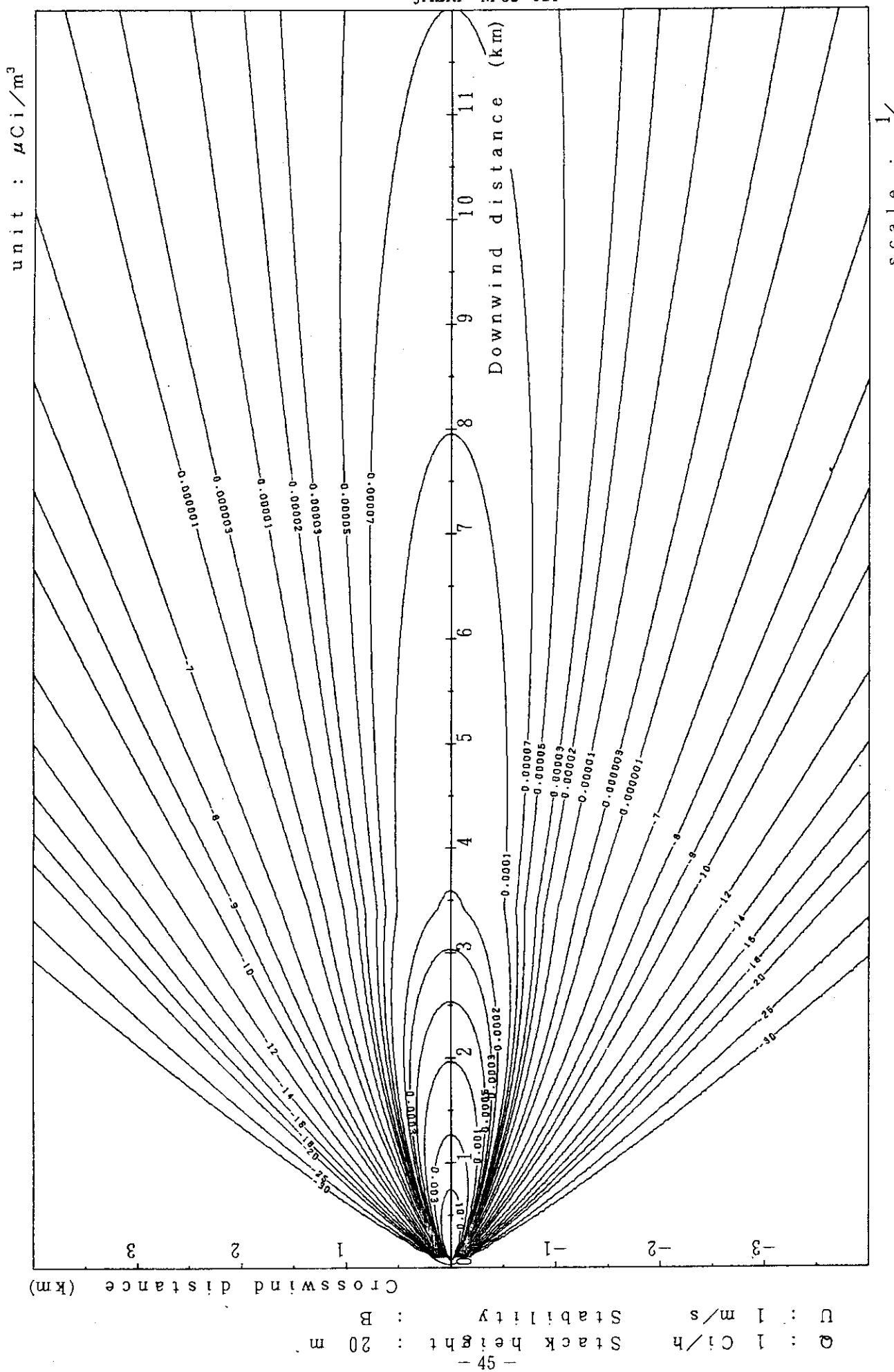


Fig. 2-3-2 (B) Isopleths of surface concentration

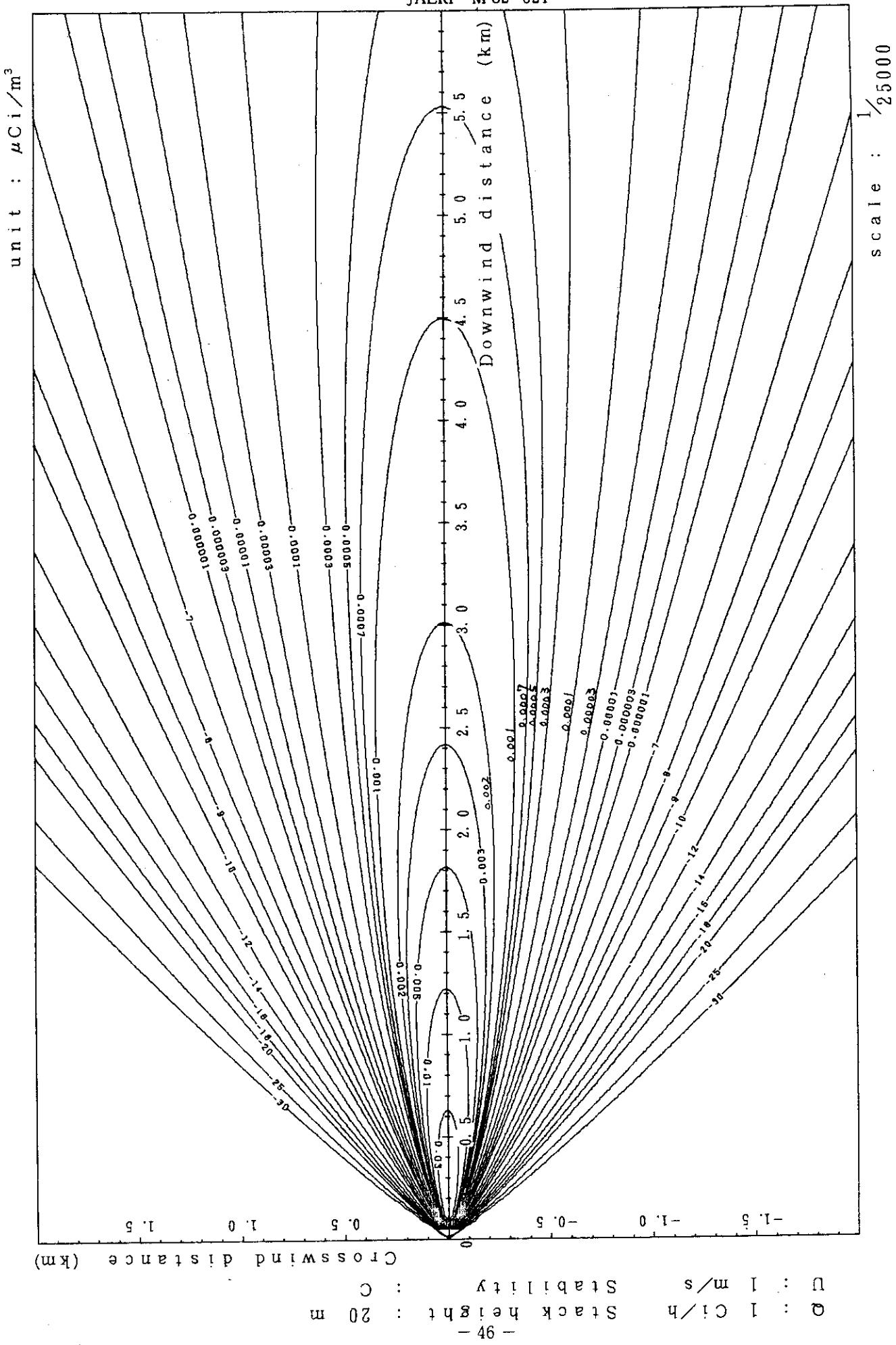


Fig. 2-3-3 (A) Isopleths of surface concentration

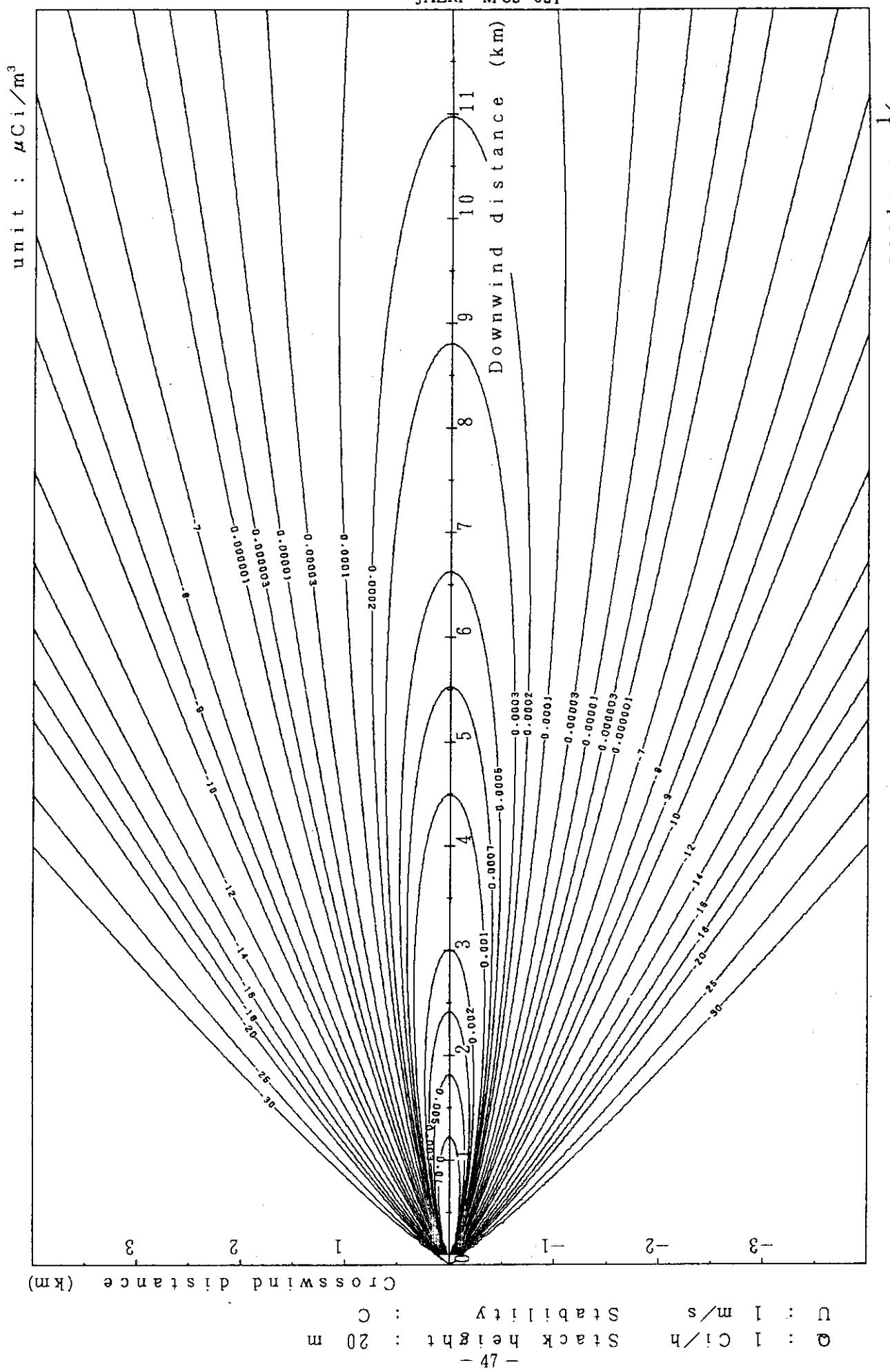


Fig. 2-3-3 (B) Isopleths of surface concentration

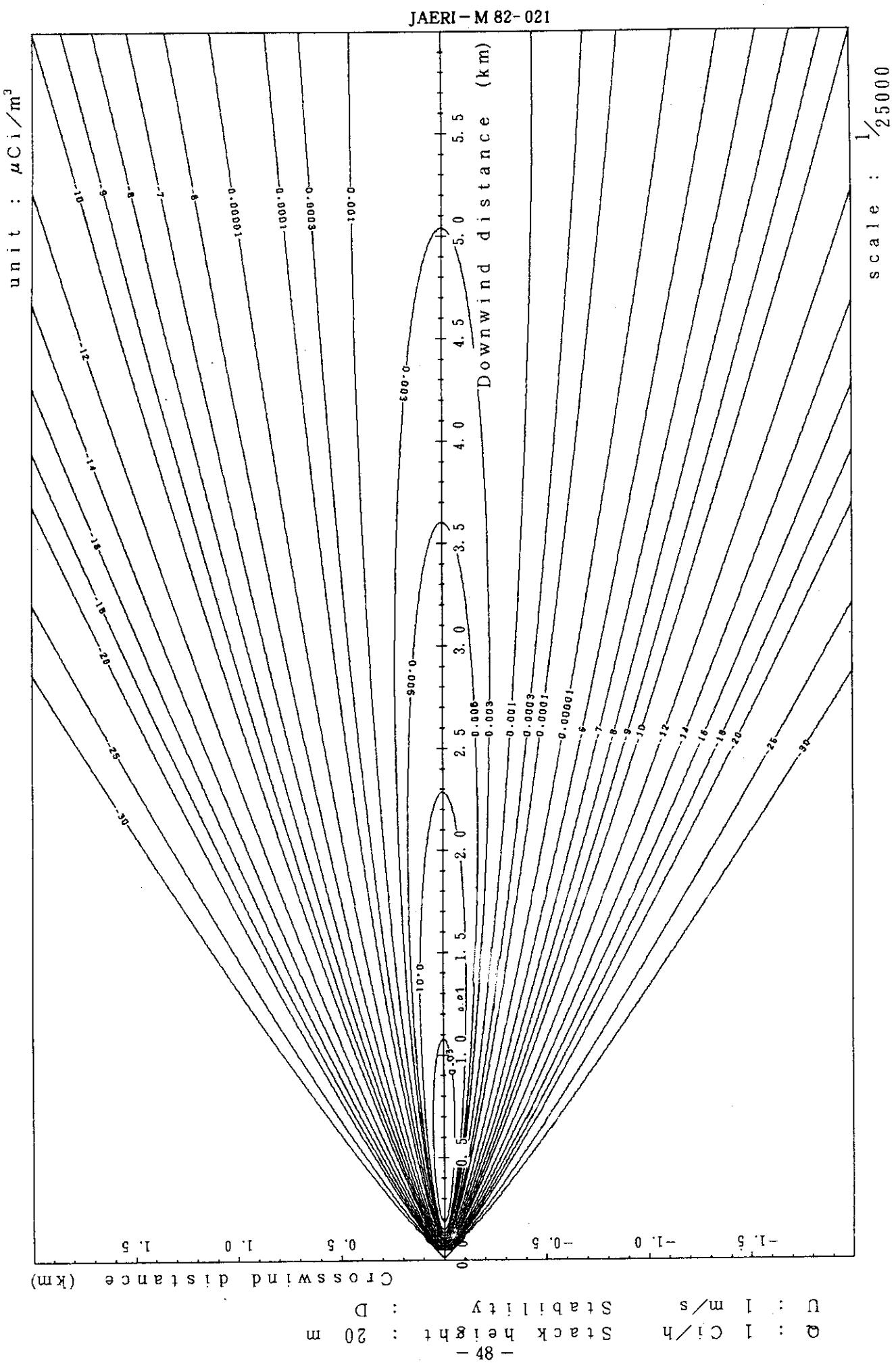


Fig. 2-3-4(A) Isopleths of surface concentration

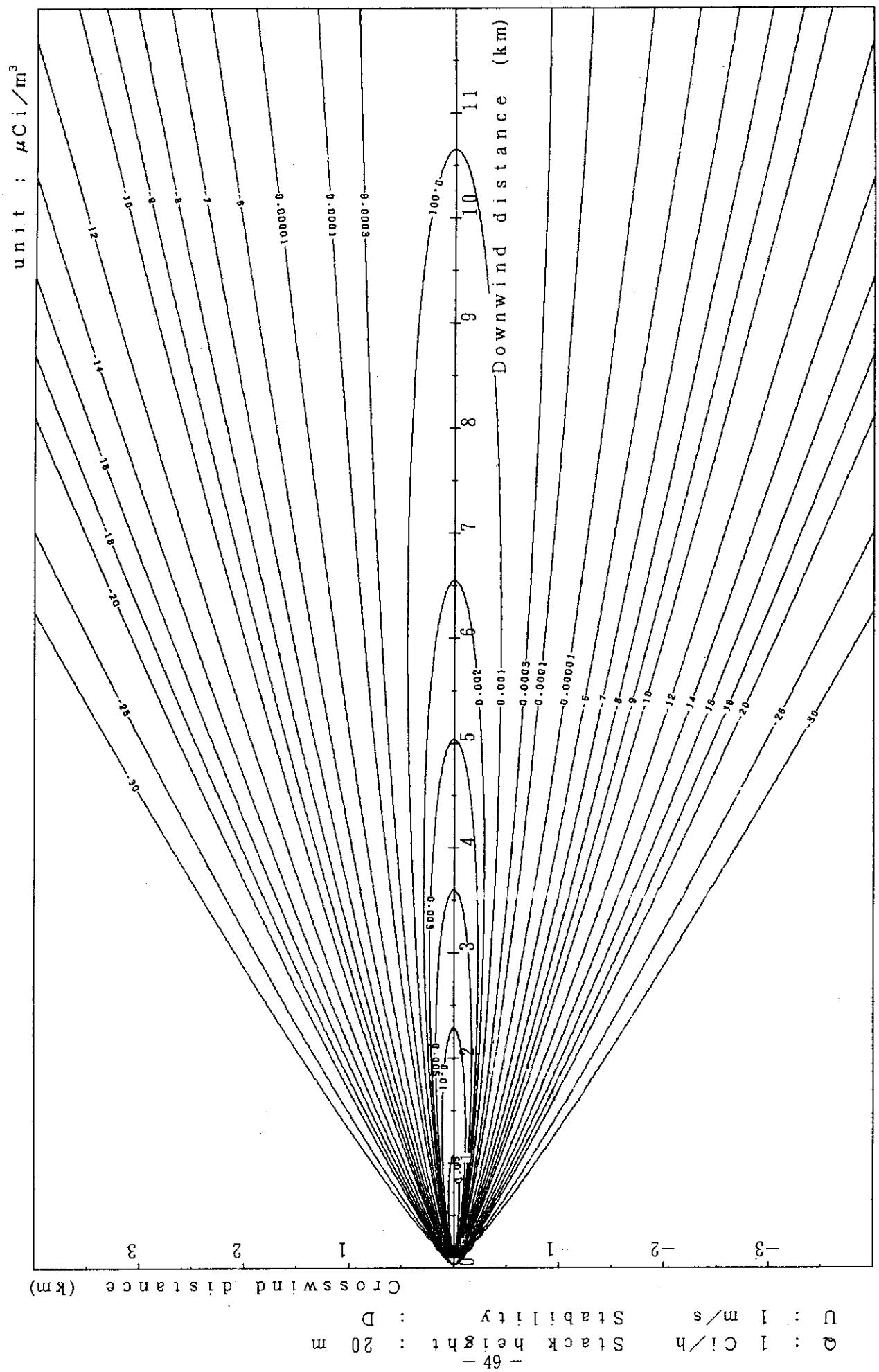


Fig. 2-3-4(B) Isopleths of surface concentration  
scale :  $1/50000$

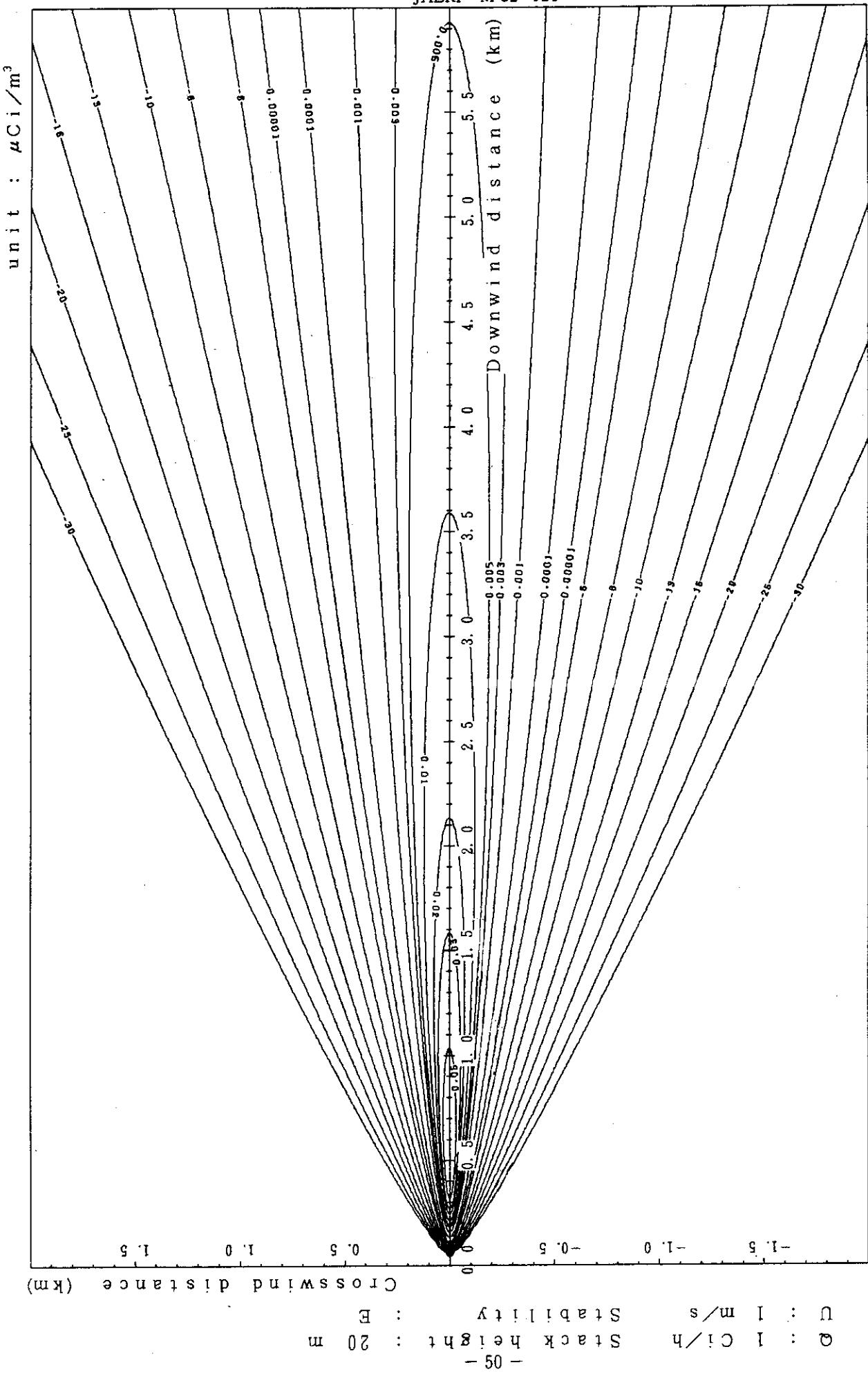


Fig. 2-3-5 (A) Isopleths of surface concentration

JAERI - M 82 - 021

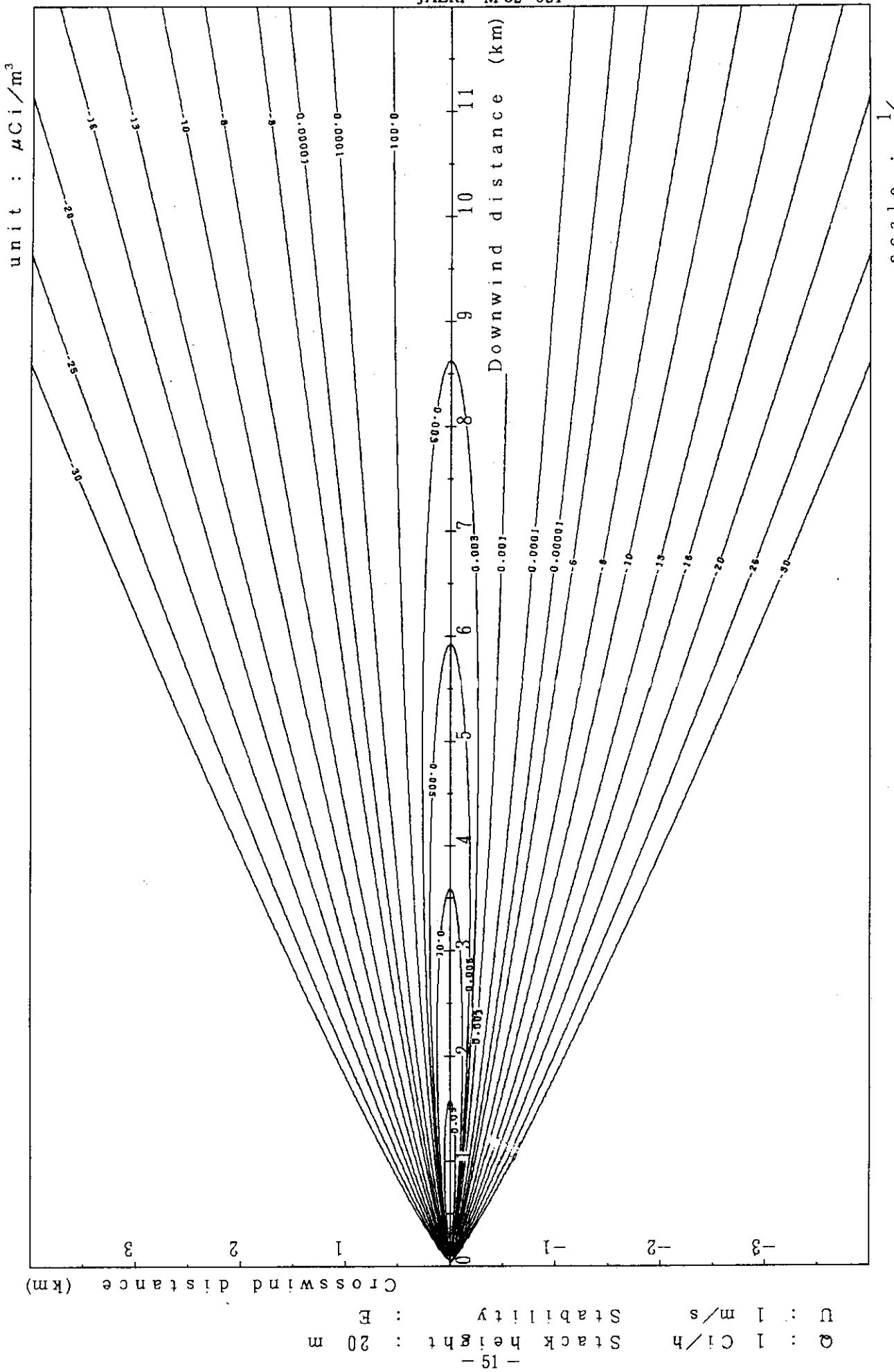


Fig. 2-3-5 (B) Isopleths of surface concentration

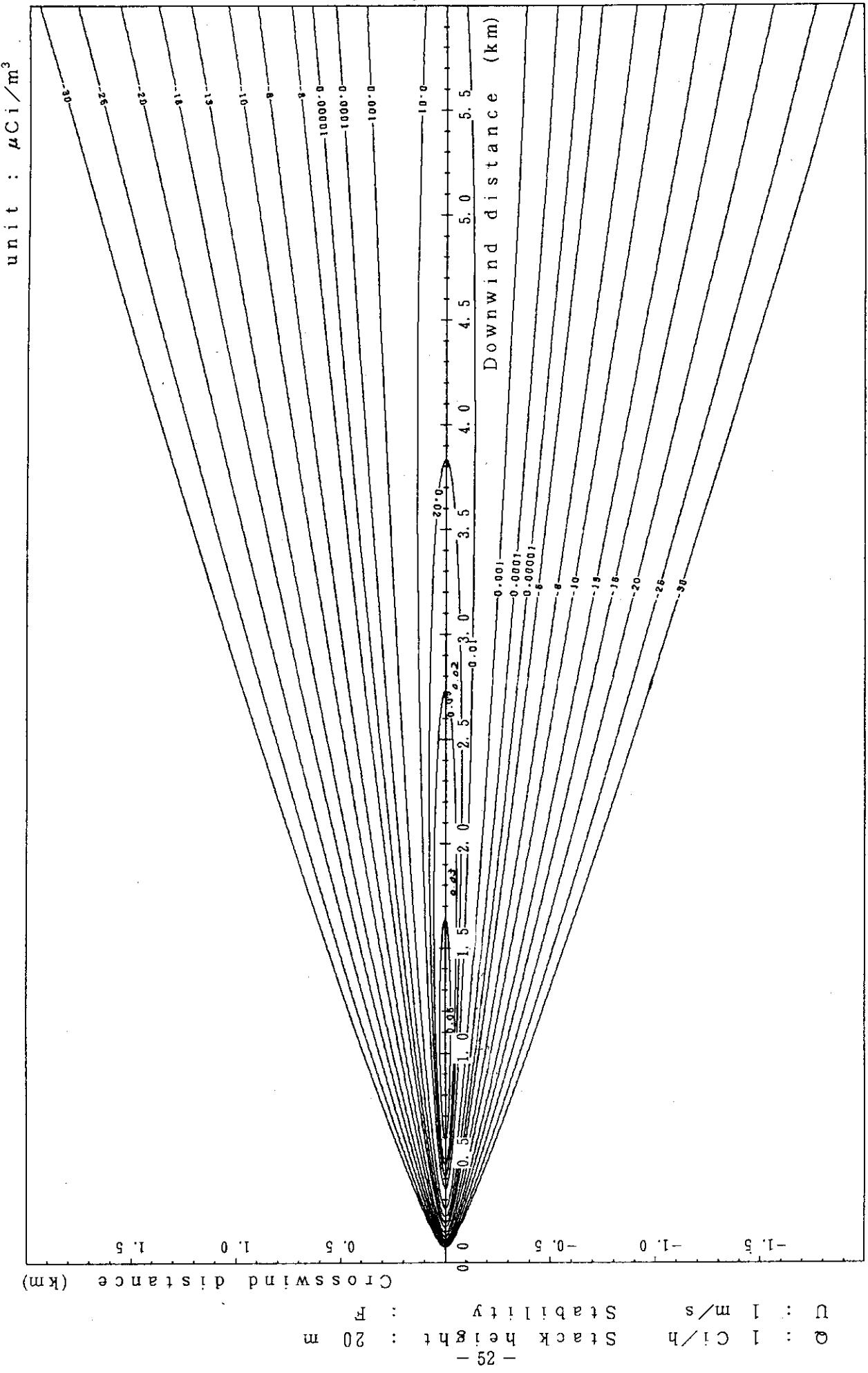


Fig. 2-3-6 (A) Isopleths of surface concentration  
scale :  $1/25000$

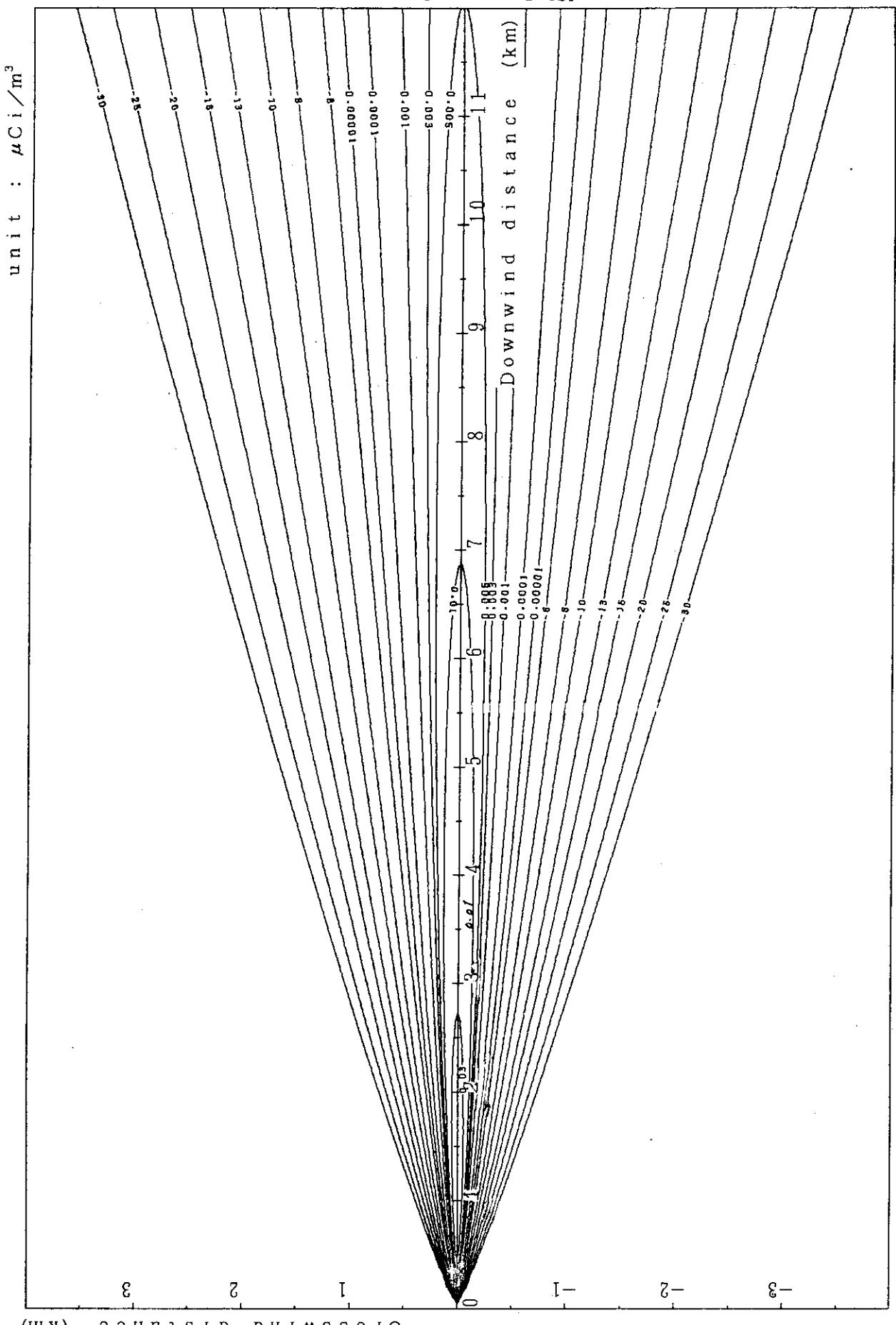


Fig. 2-3-6 (B) Isopleths of surface concentration

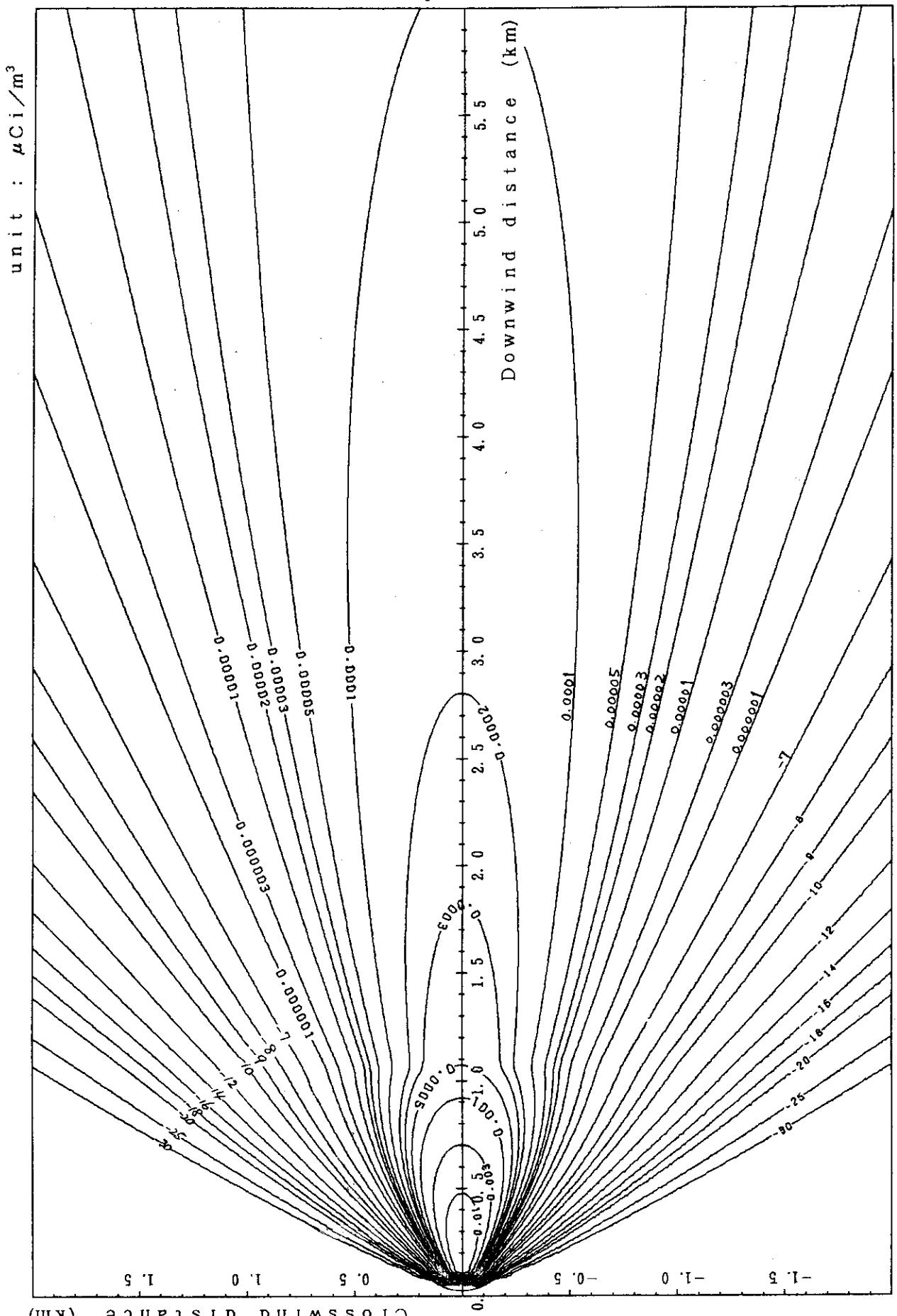


Fig. 2-4-1 (A) Isopleths of surface concentration scale : 1/25000  
 Unit :  $\mu\text{Ci}/\text{m}^3$   
 Stacking height : 40 m  
 $Q : 1 \text{ Ci/h}$   
 $U : 1 \text{ m/s}$

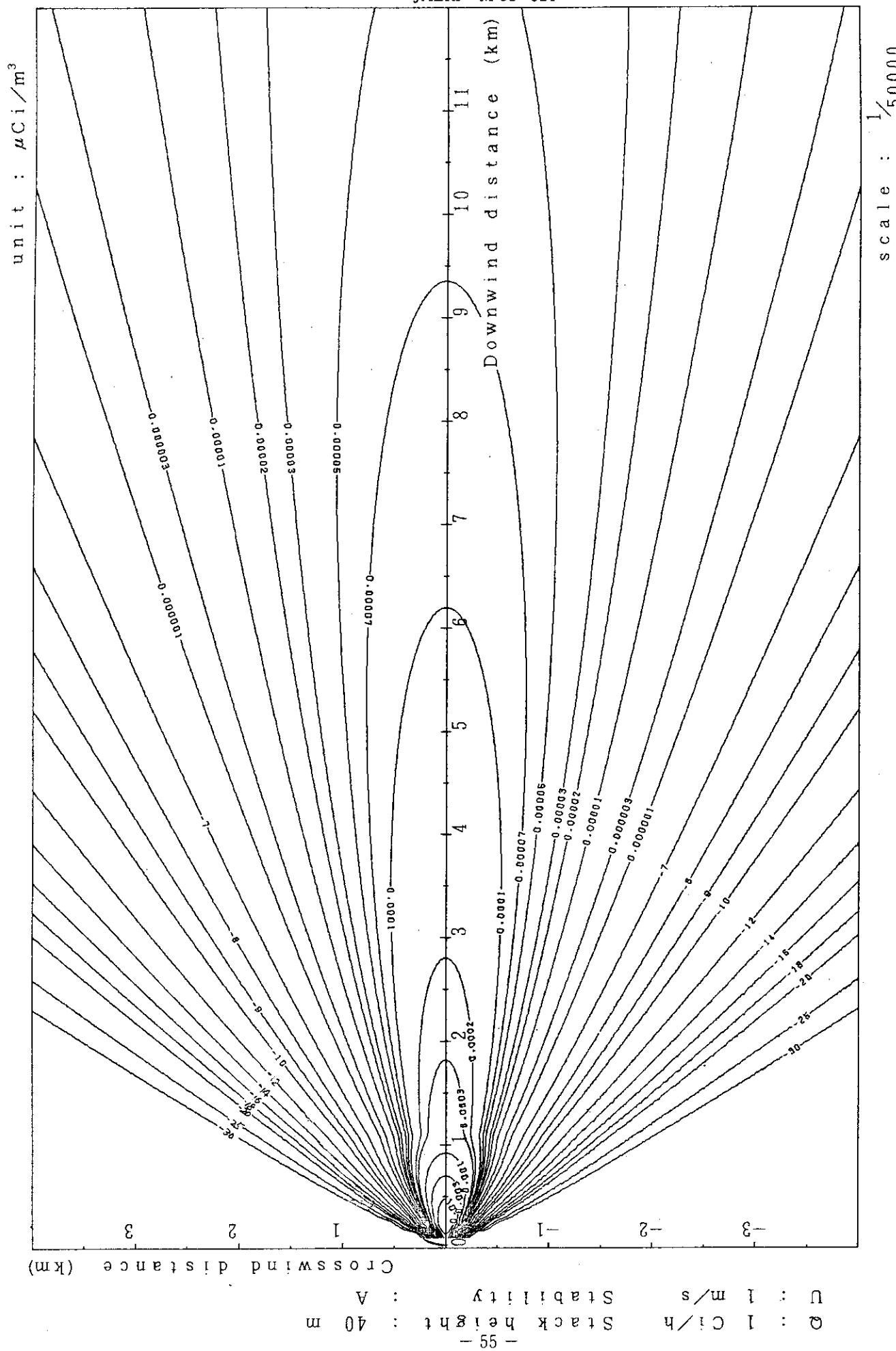


Fig. 2-4-1 (B) Isopleths of surface concentration

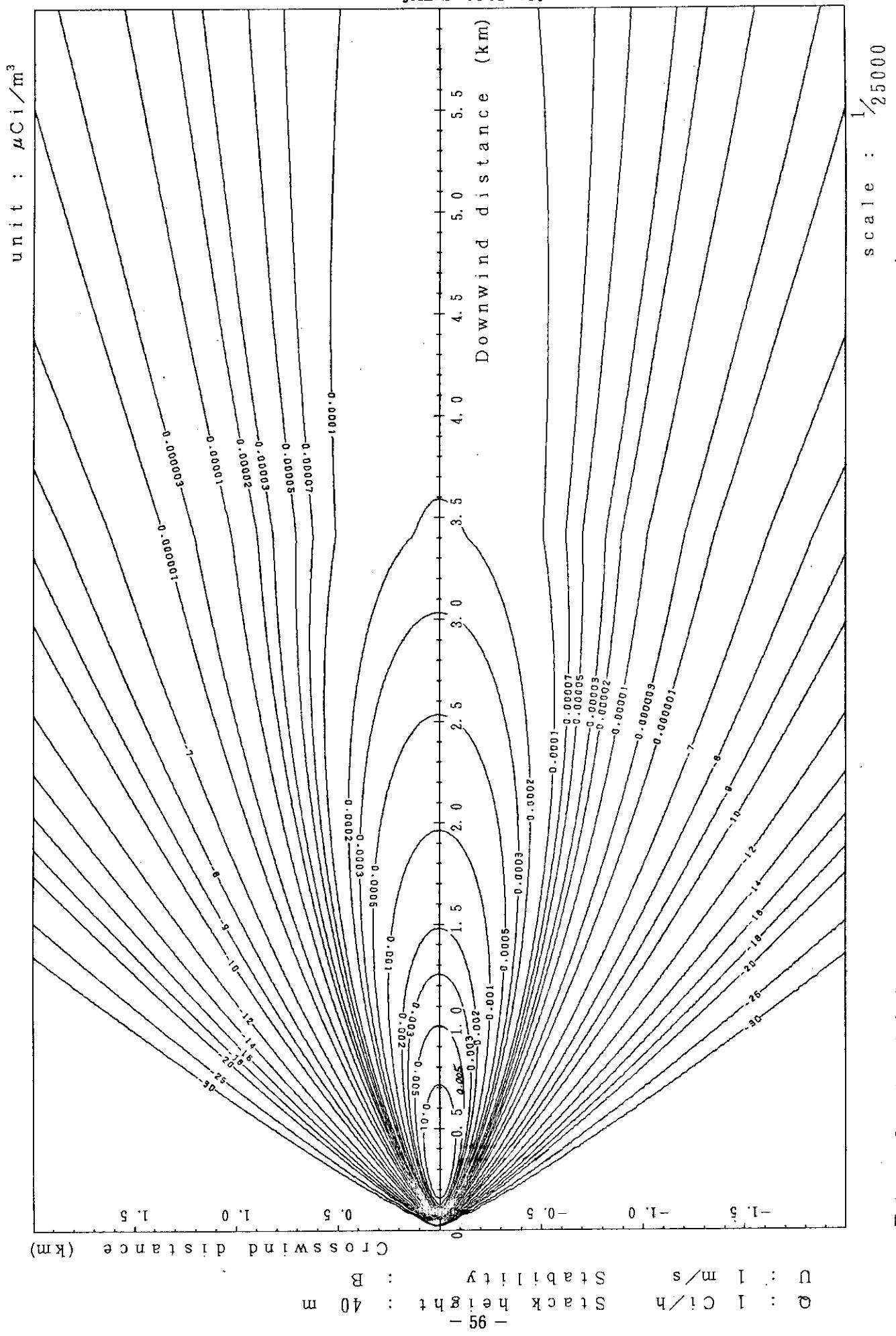


Fig. 2-4-2 (A) Isopleths of surface concentration

JAERI-M 82-021

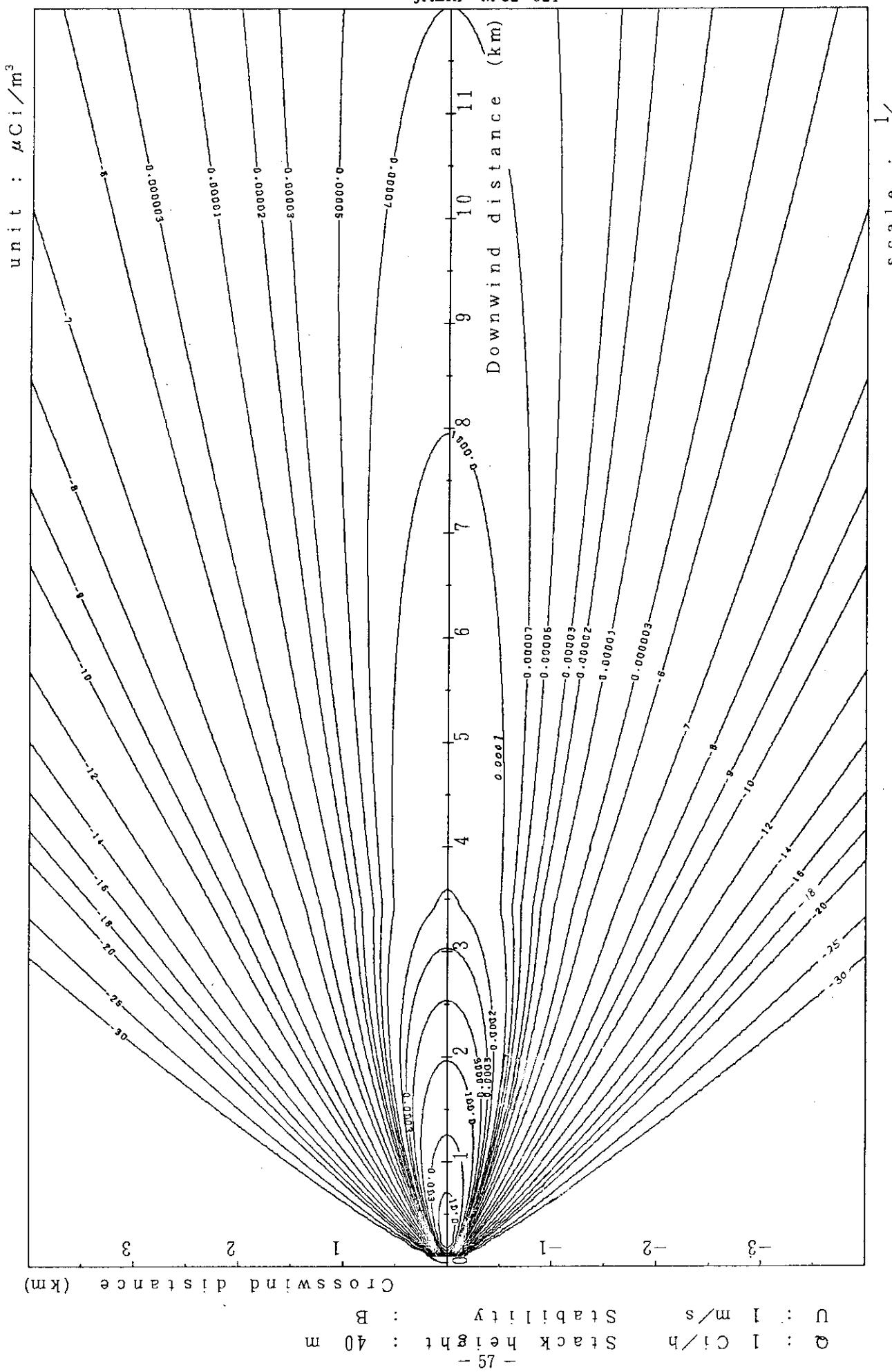


Fig. 2-4-2 (B) Isopleths of surface concentration

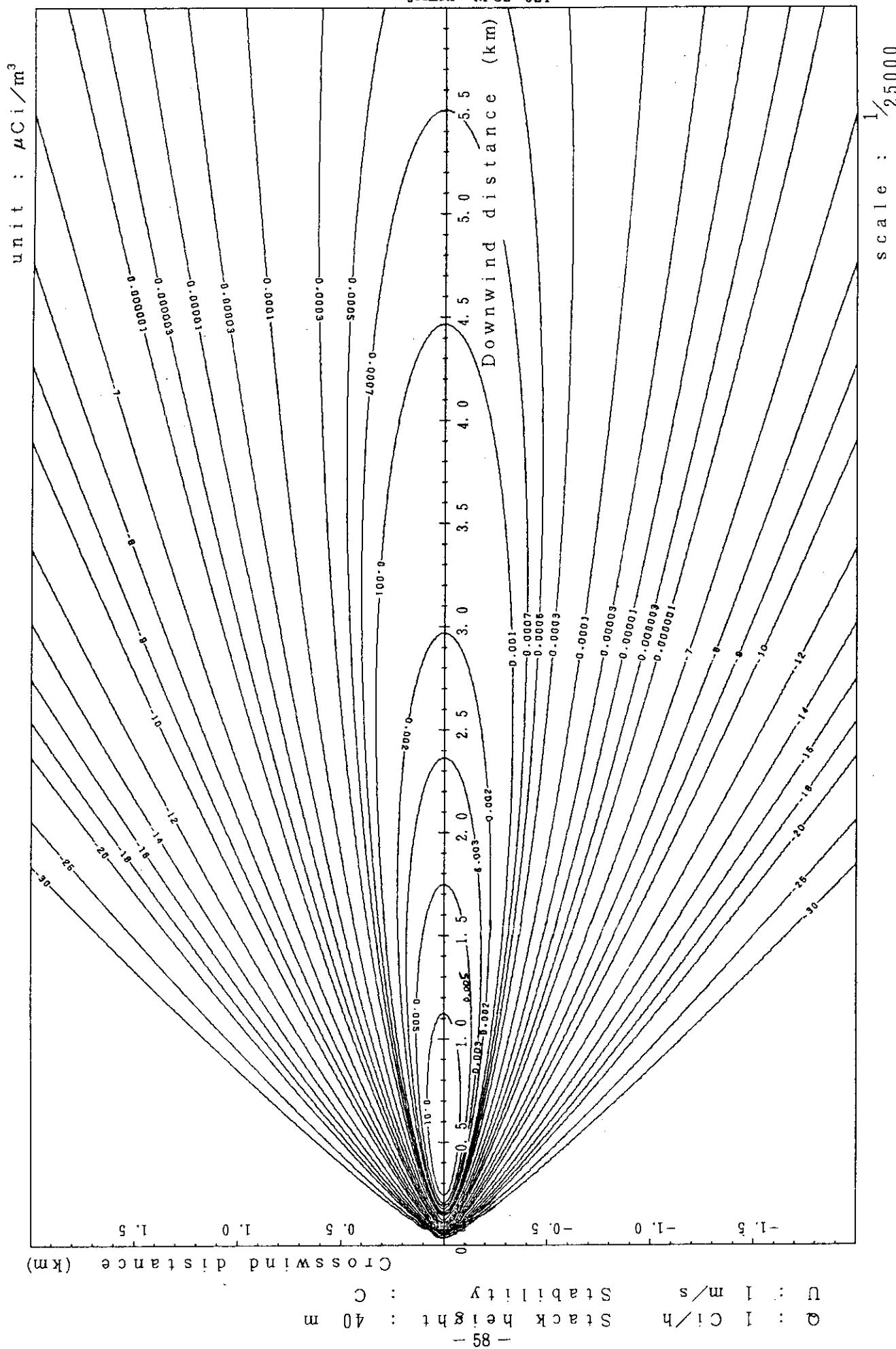


Fig. 2-4-3 (A) Isopleths of surface concentration

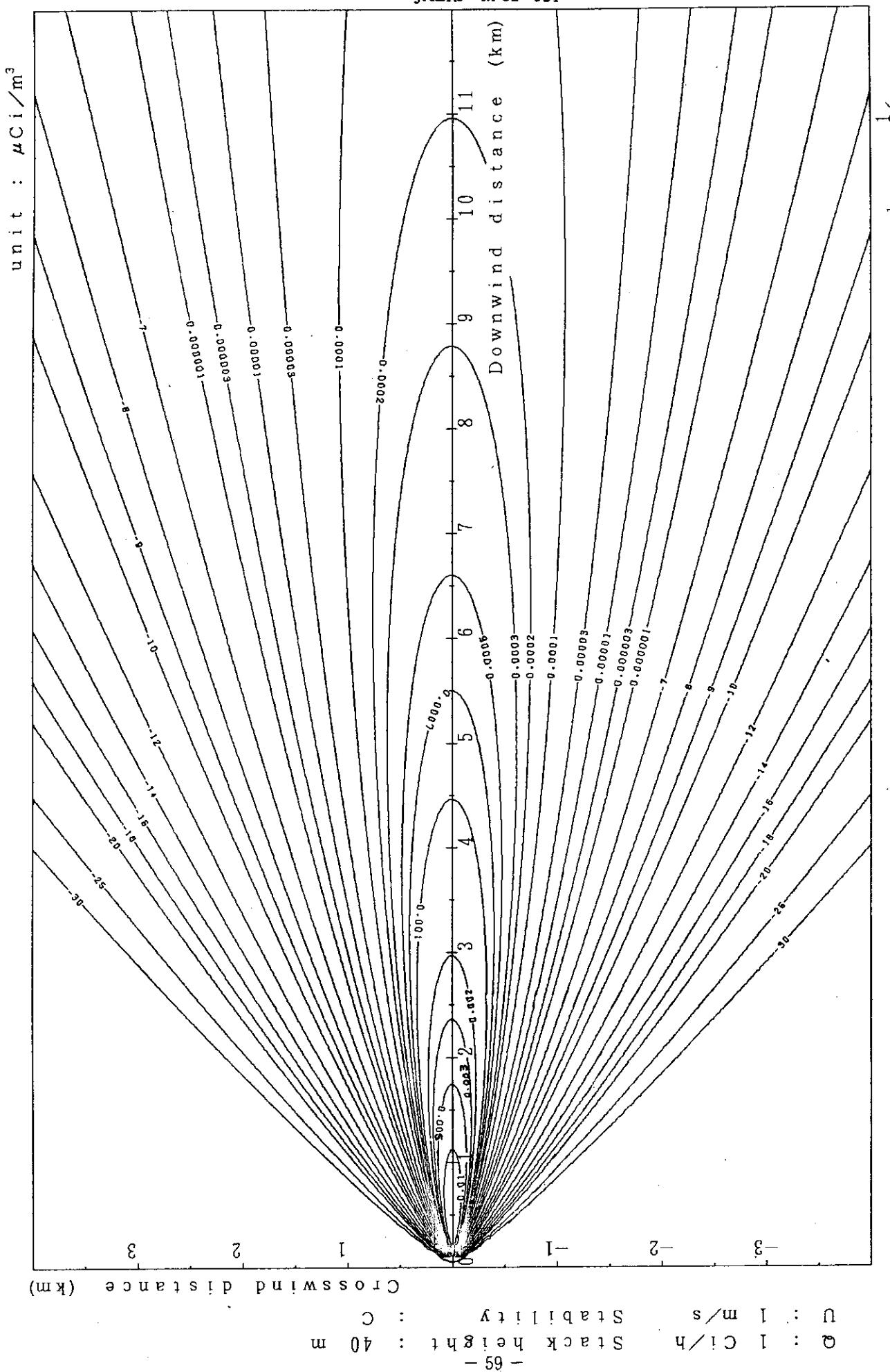


Fig. 2-4-3(B) Isopleths of surface concentration

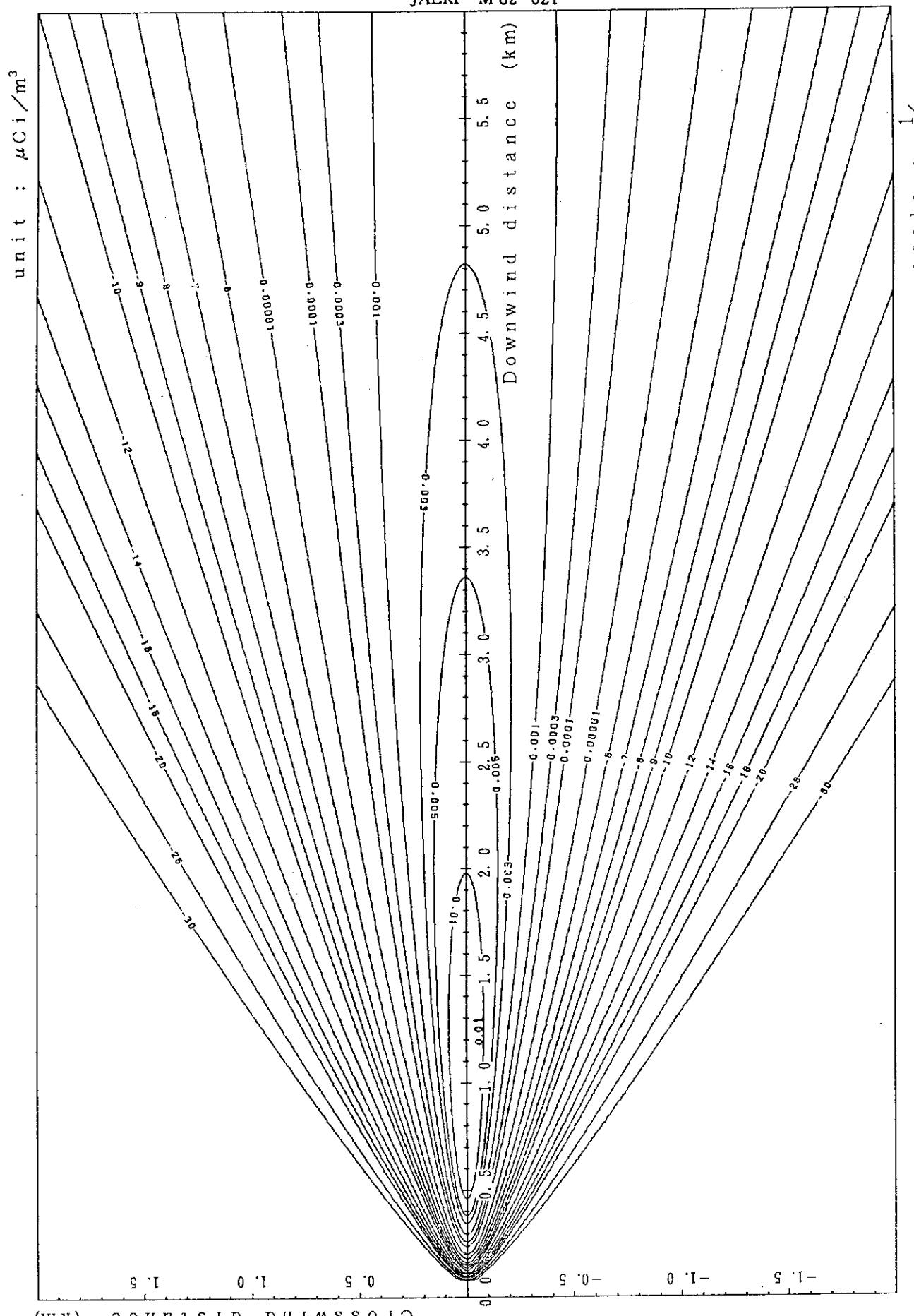


Fig. 2-4-4 (A) Isopleths of surface concentration

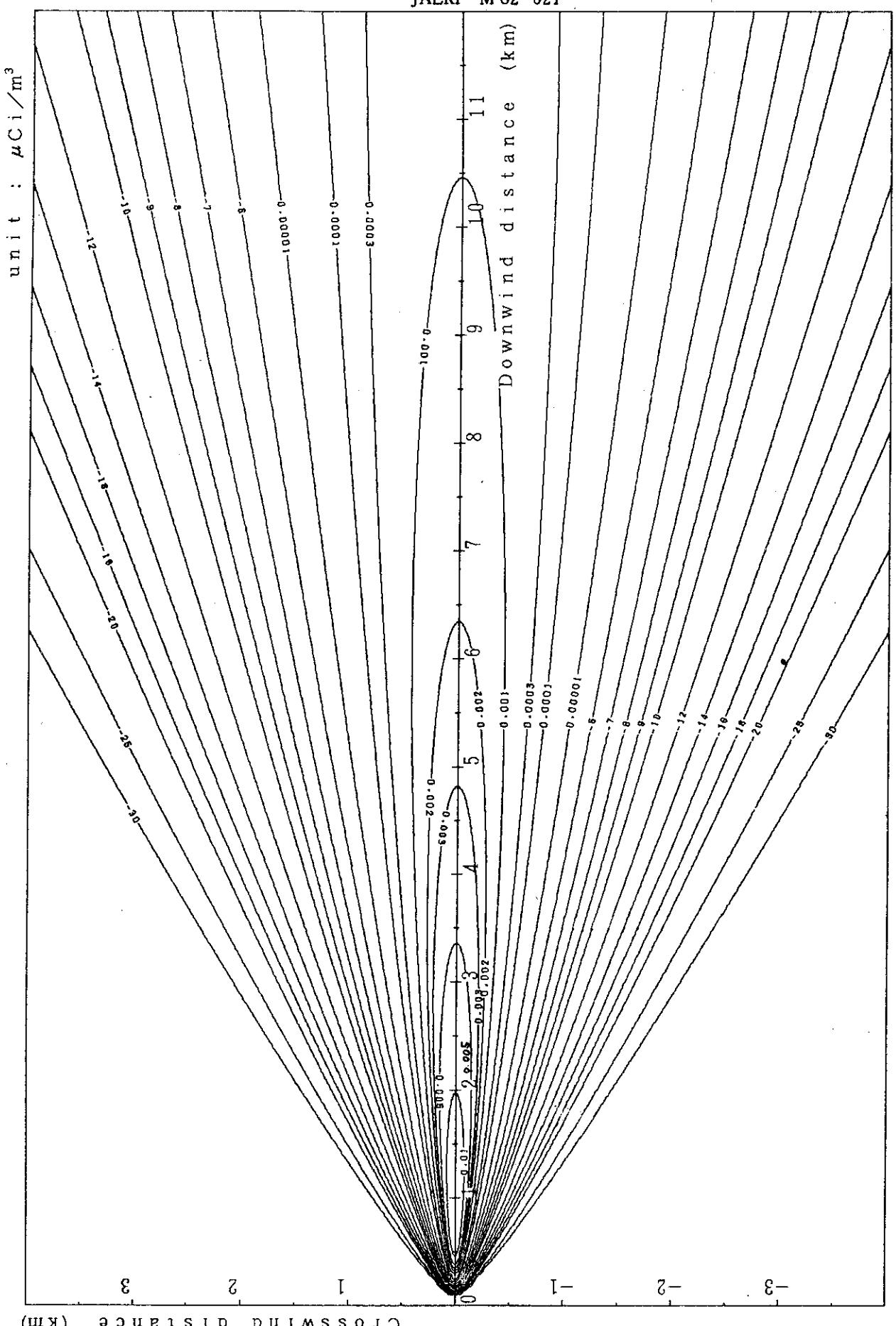


Fig. 2-4-4 (B) Isopleths of surface concentration

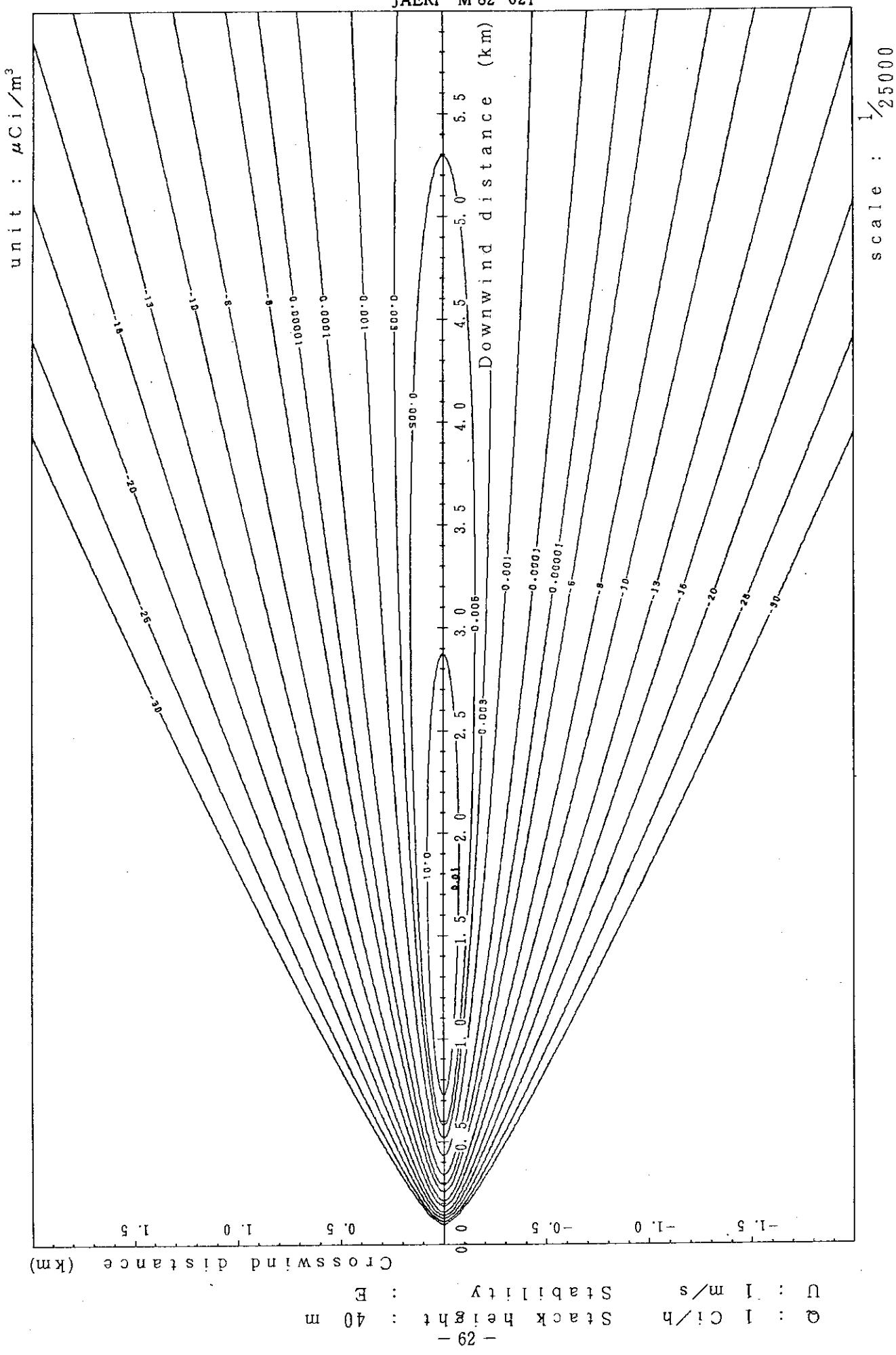


Fig. 2-4-5 (A) Isopleths of surface concentration

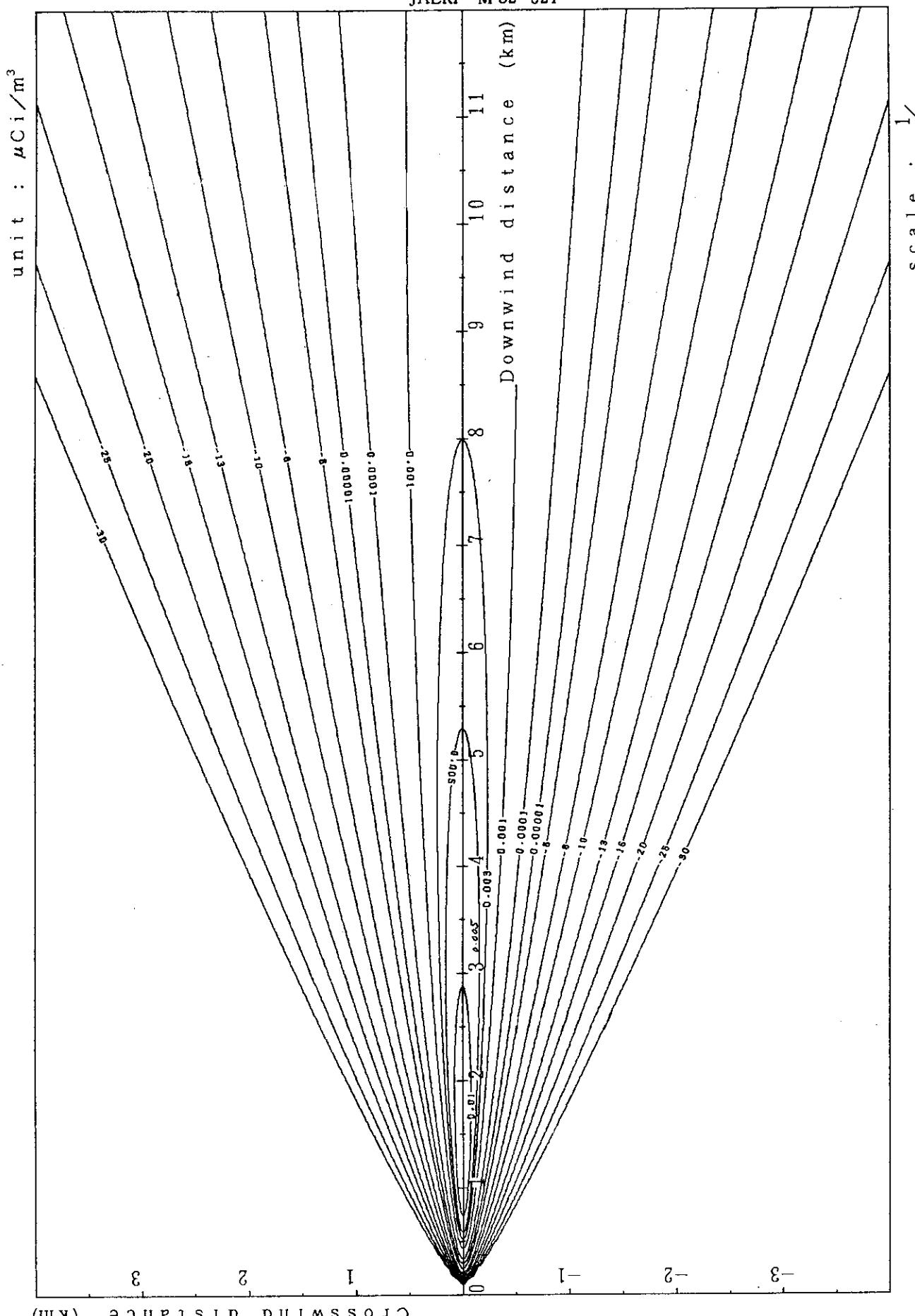


Fig. 2-4-5(B) Isopleths of surface concentration

$Q$  :  $1 \text{ Ci/h}$  Stack height :  $40 \text{ m}$  Stability : E

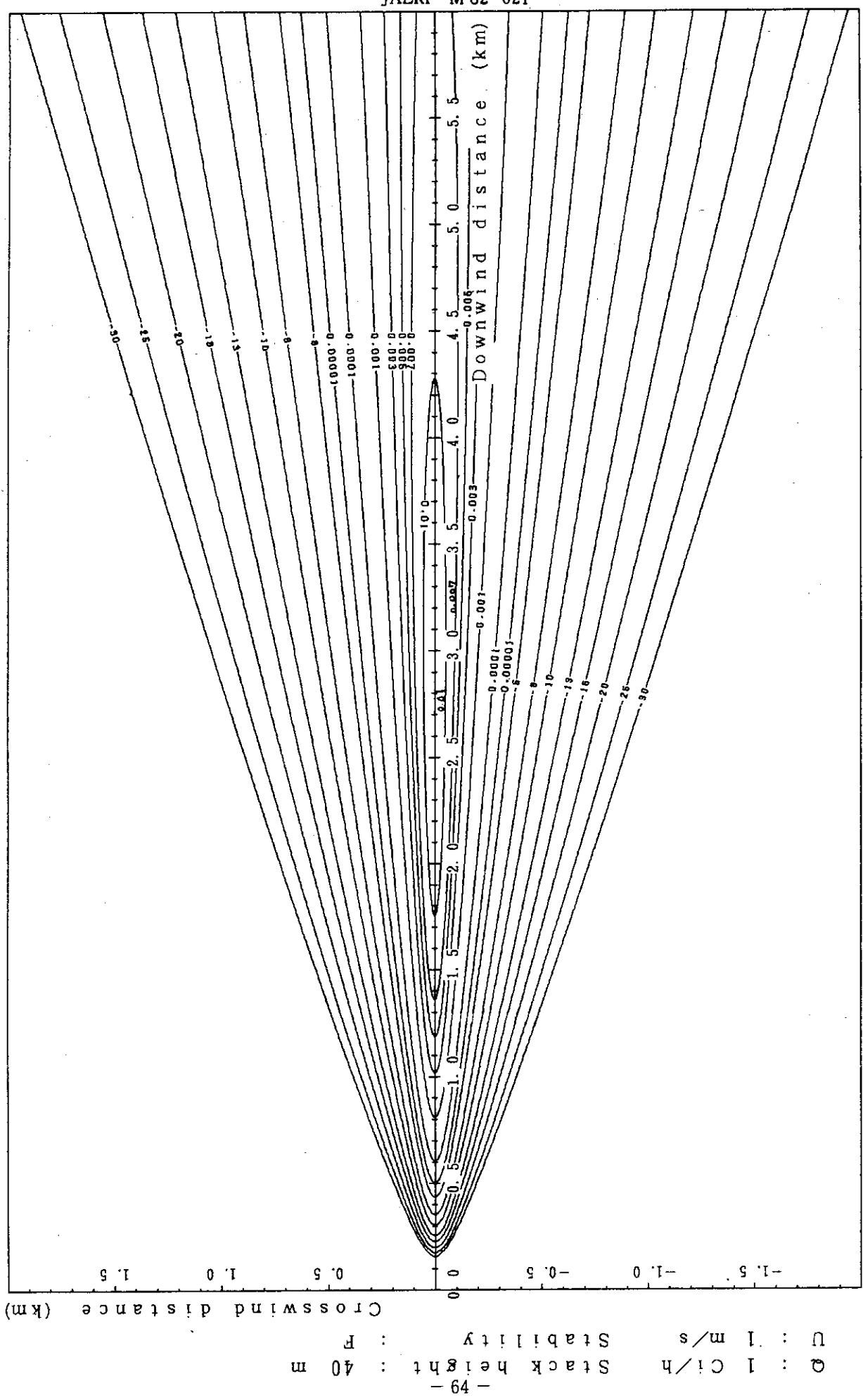
unit :  $\mu\text{Ci}/\text{m}^3$ 

Fig. 2-4-6(A) Isopleths of surface concentration  
scale :  $1/25000$

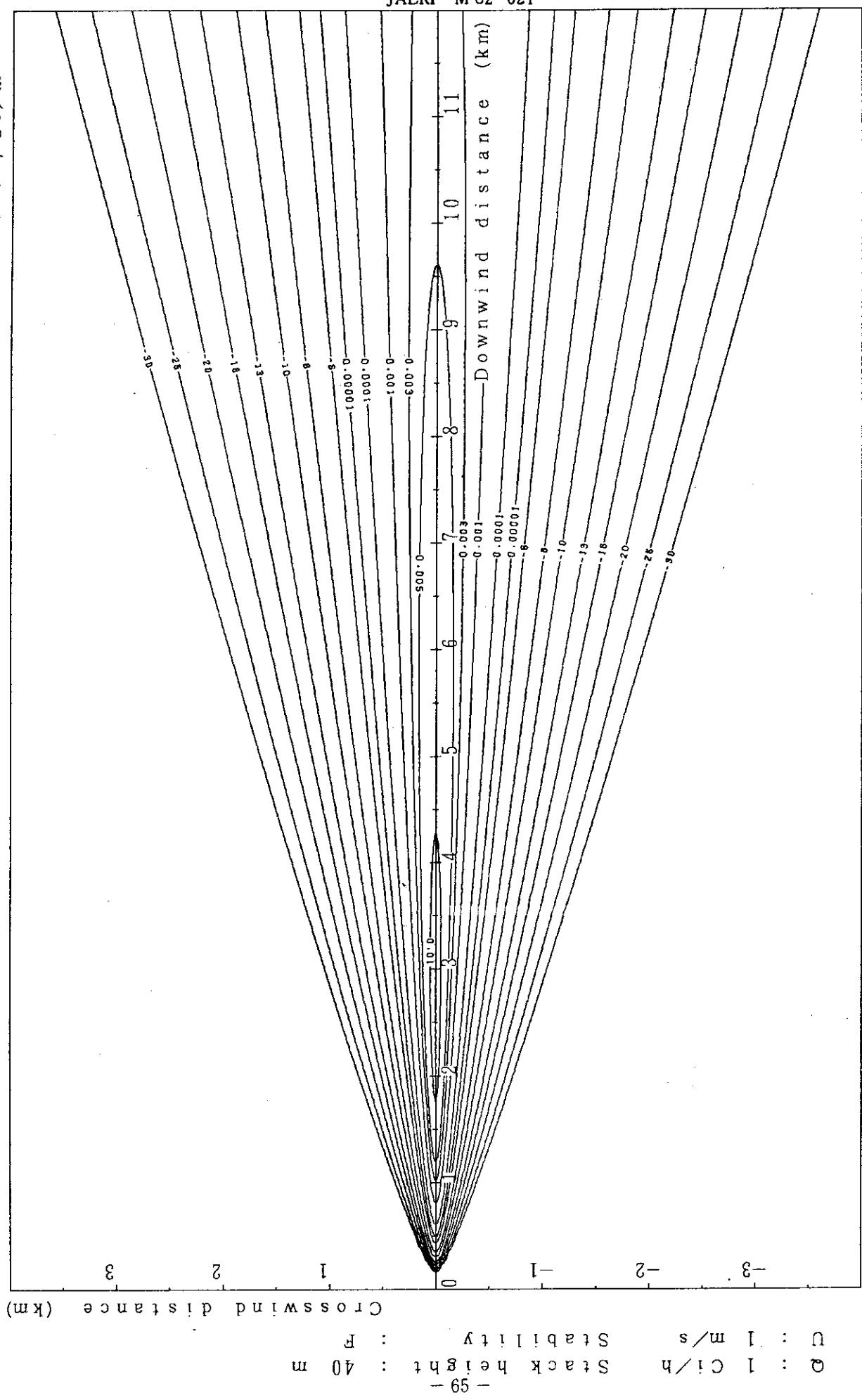
unit :  $\mu\text{Ci}/\text{m}^3$ 

Fig. 2-4-6 (B) Isopleths of surface concentration  
scale :  $1/50000$

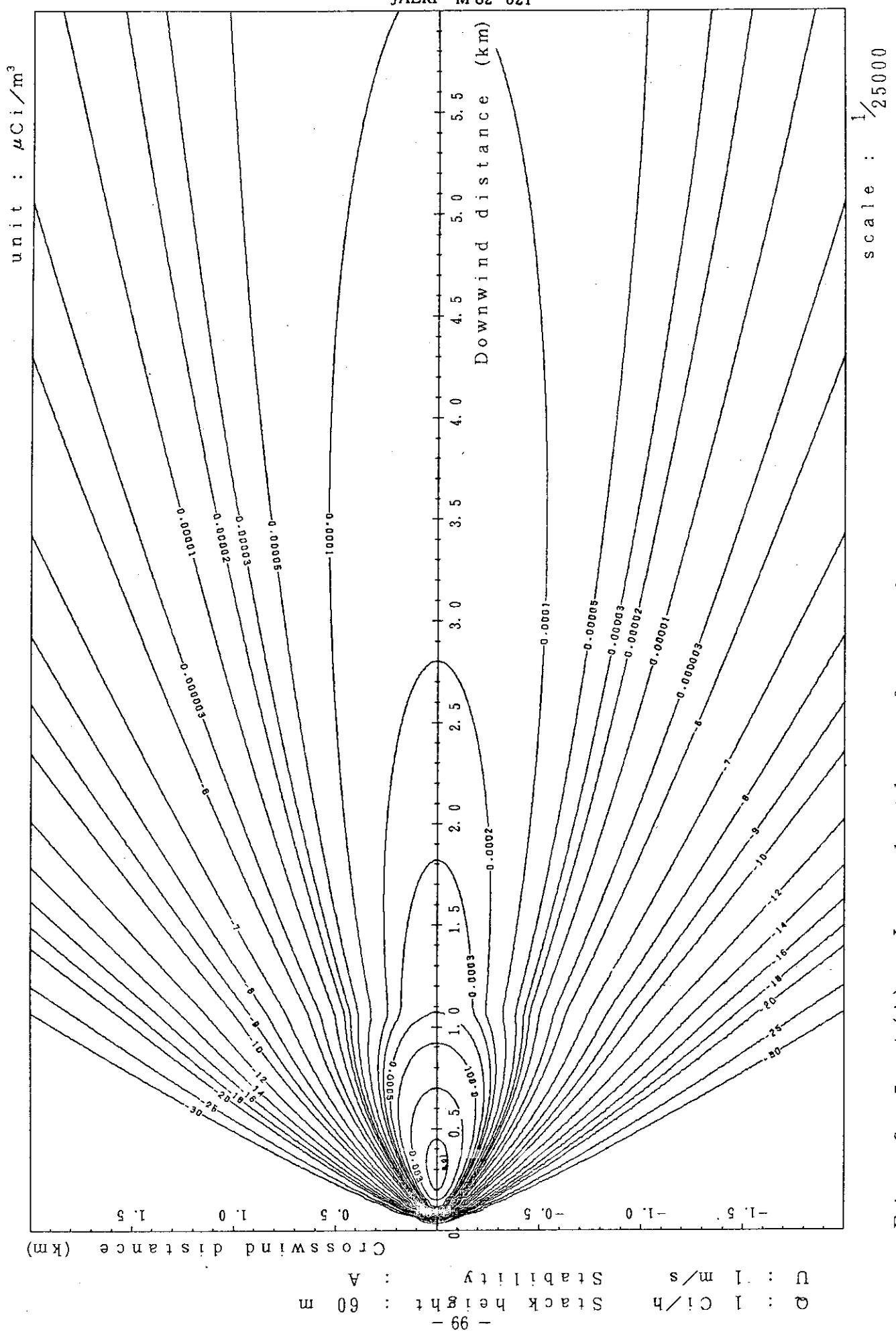


Fig. 2-5-1(A) Isopleths of surface concentration

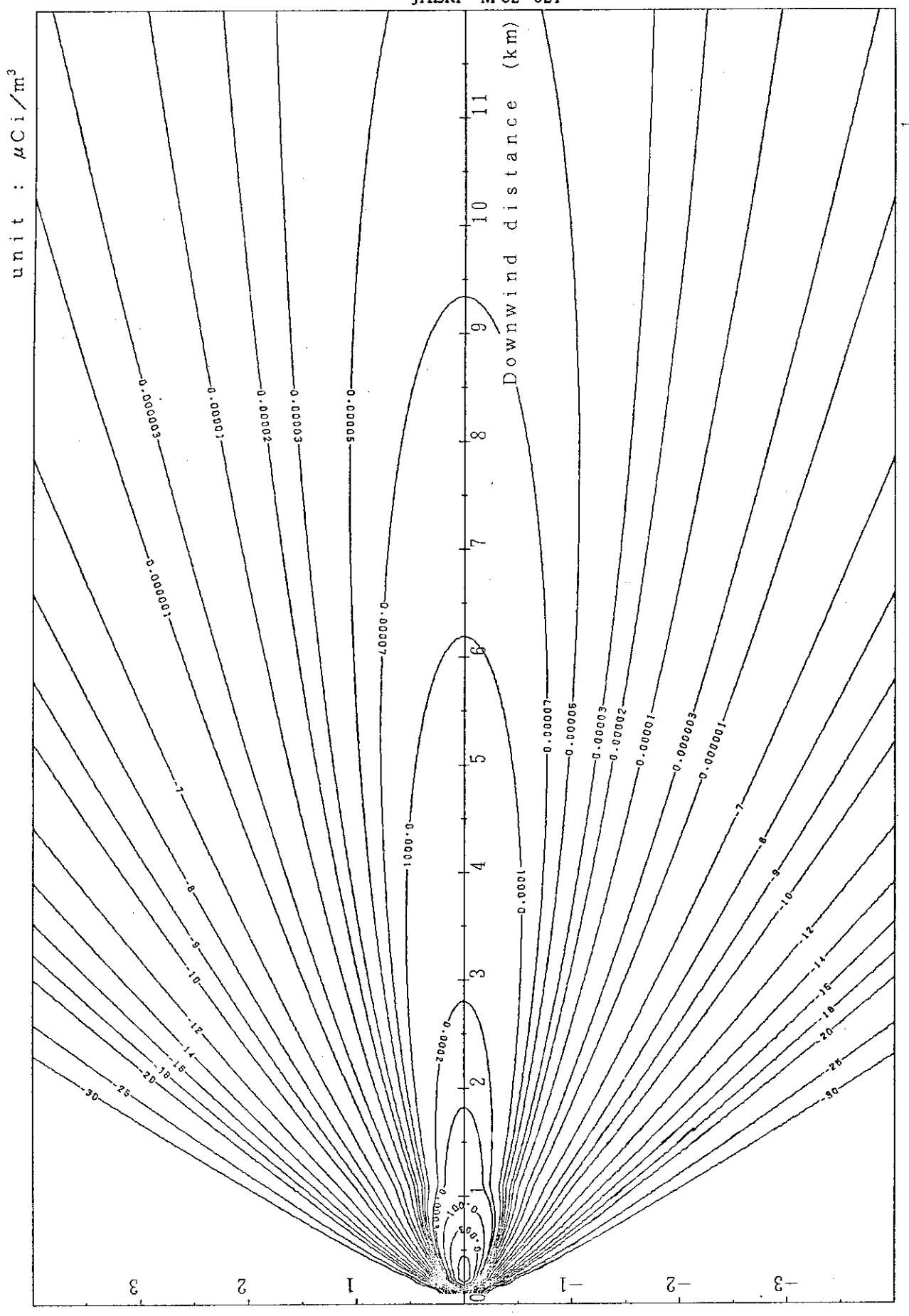


Fig. 2-5-1(B) Isopleths of surface concentration

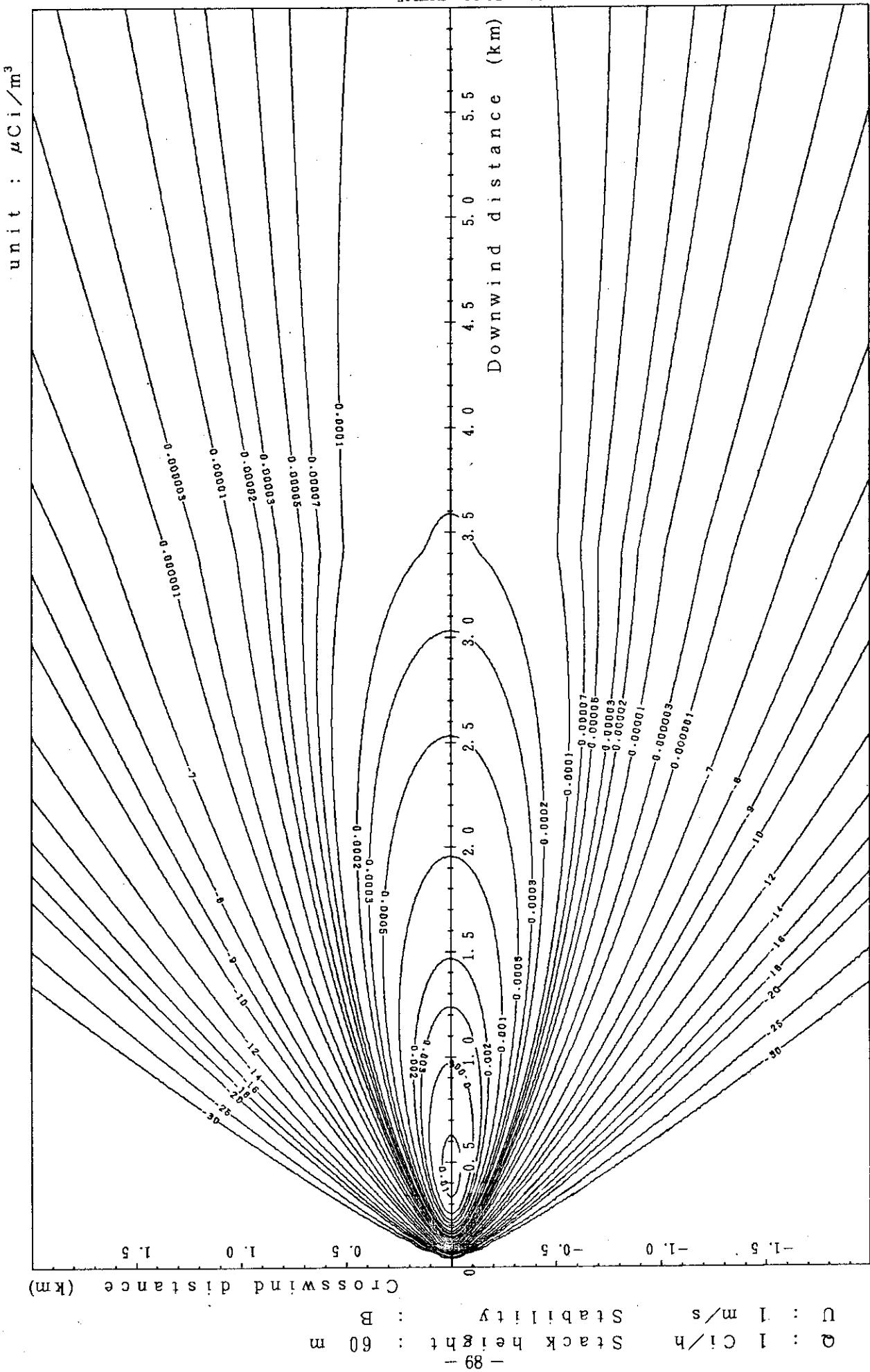


Fig. 2-5-2 (A) Isopleths of surface concentration  
scale :  $1/25000$

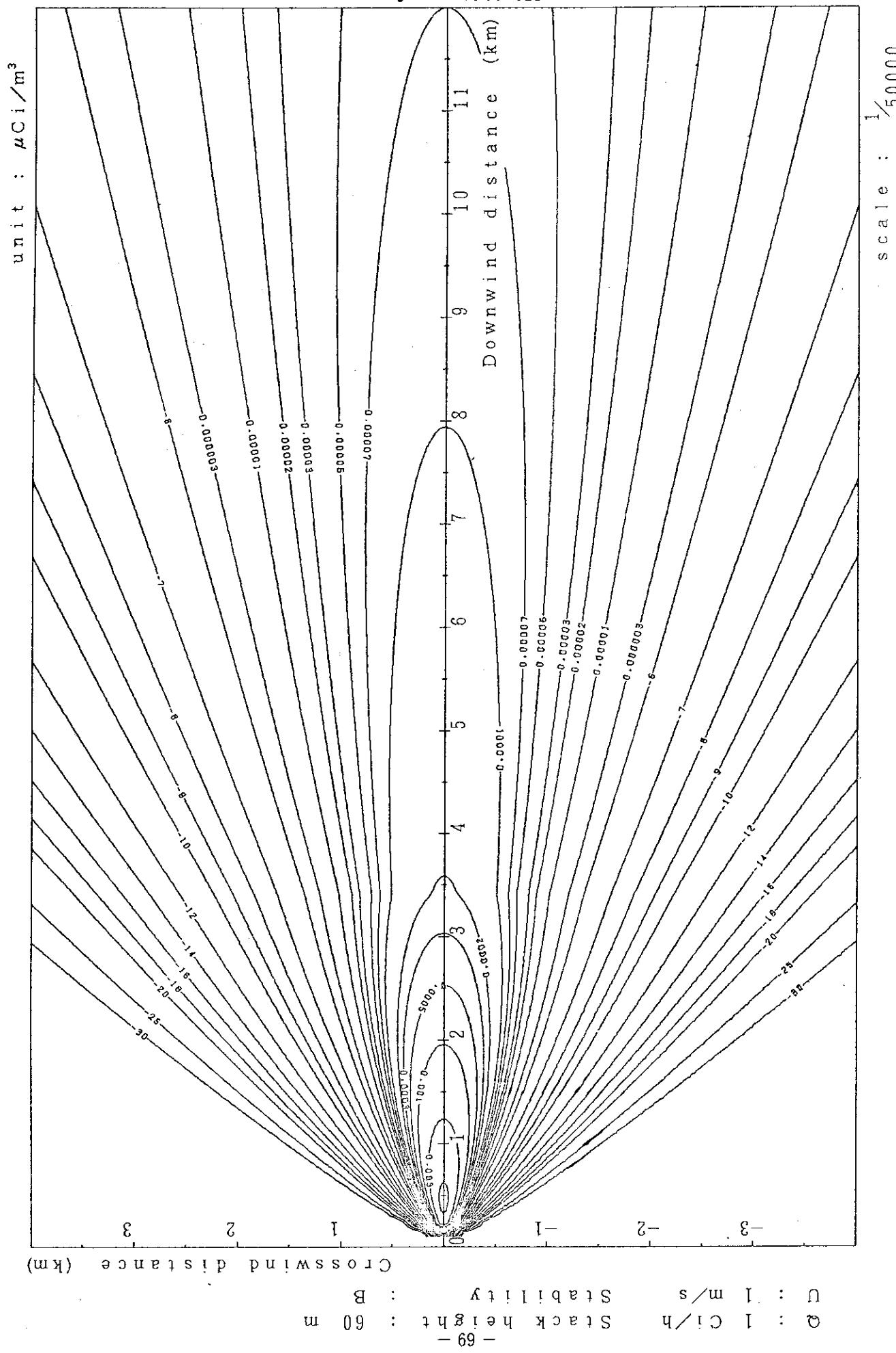


Fig. 2-5-2 (B) Isopleths of surface concentration

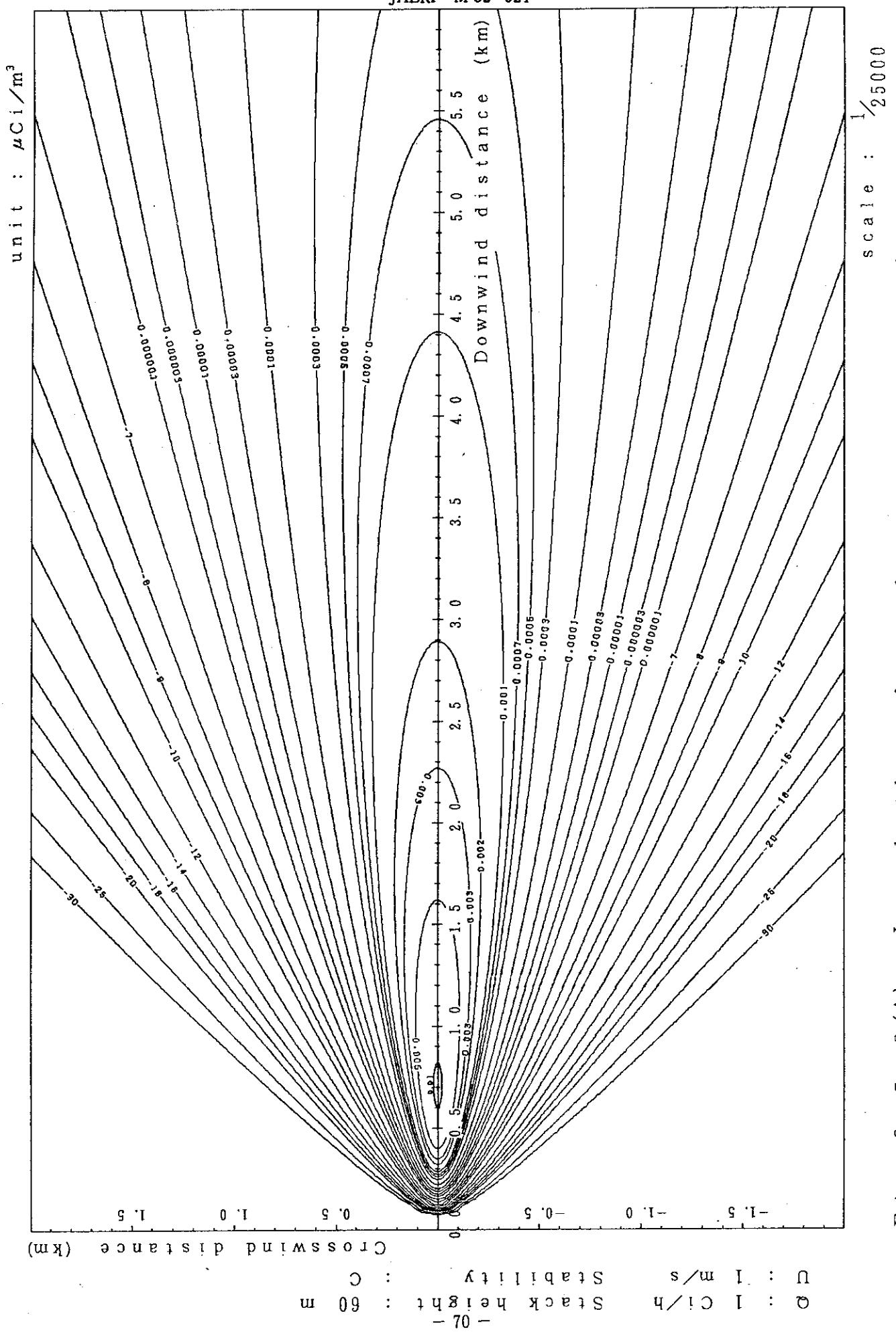


Fig. 2-5-3 (A) Isopleths of surface concentration

JAERI - M 82-021

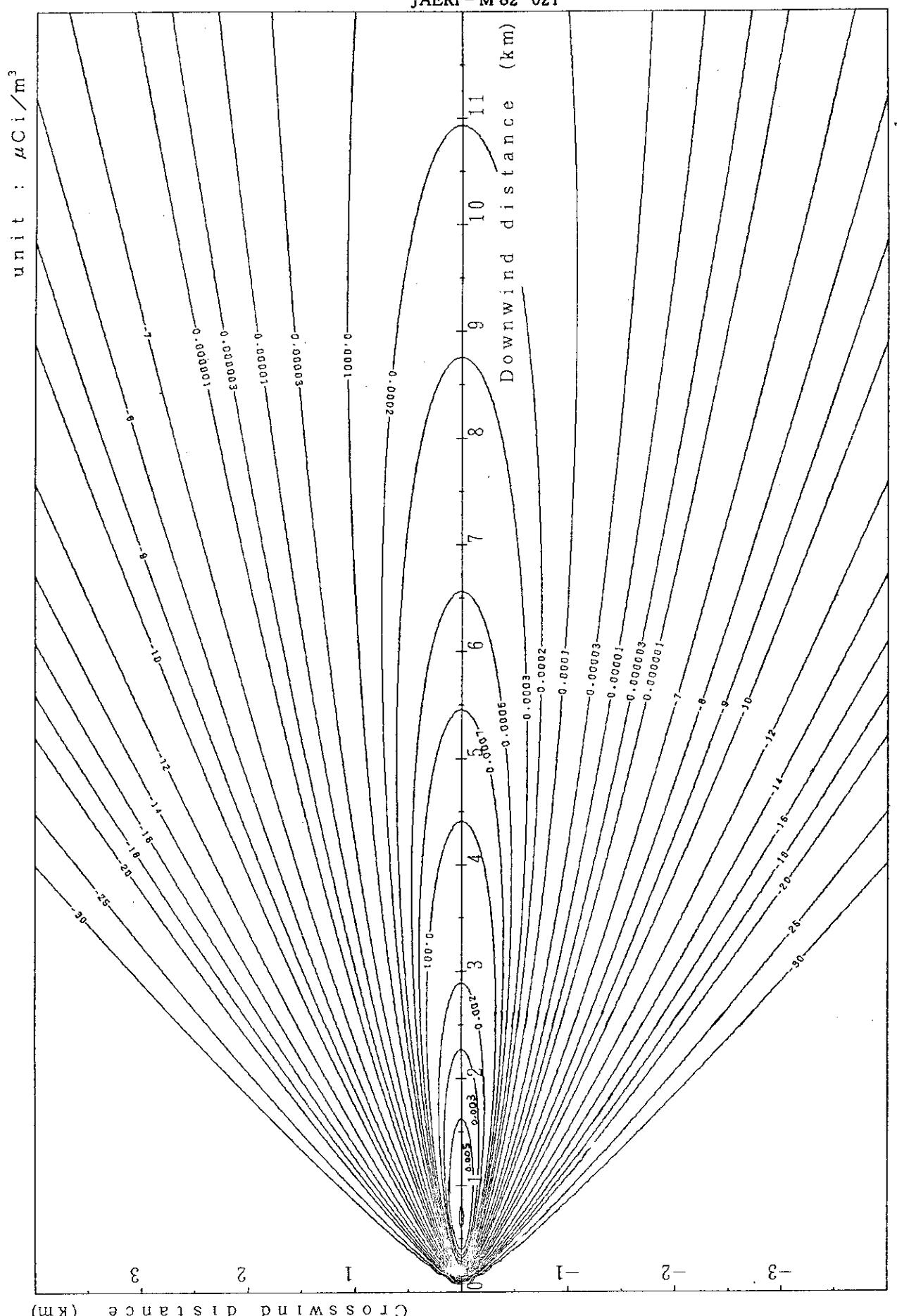


Fig. 2-5-3 (B) Isopleths of surface concentration  
Scale : 1/50000

$Q : 1 \text{ Ci/h}$  Stack height : 60 m Stability : C  
 $U : 1 \text{ m/s}$

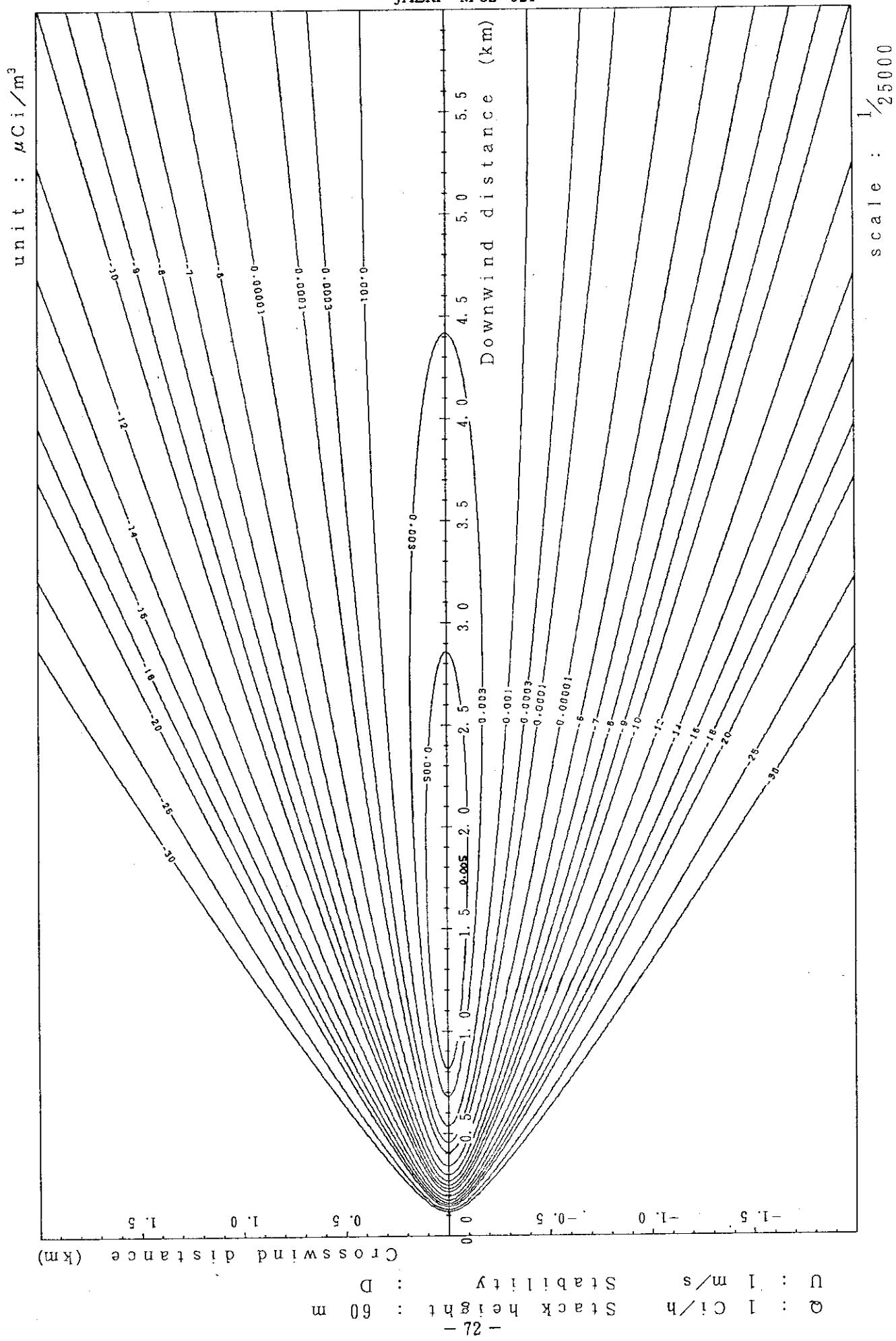


Fig. 2-5-4 (A) Isopleths of surface concentration

JAERI-M 82-021

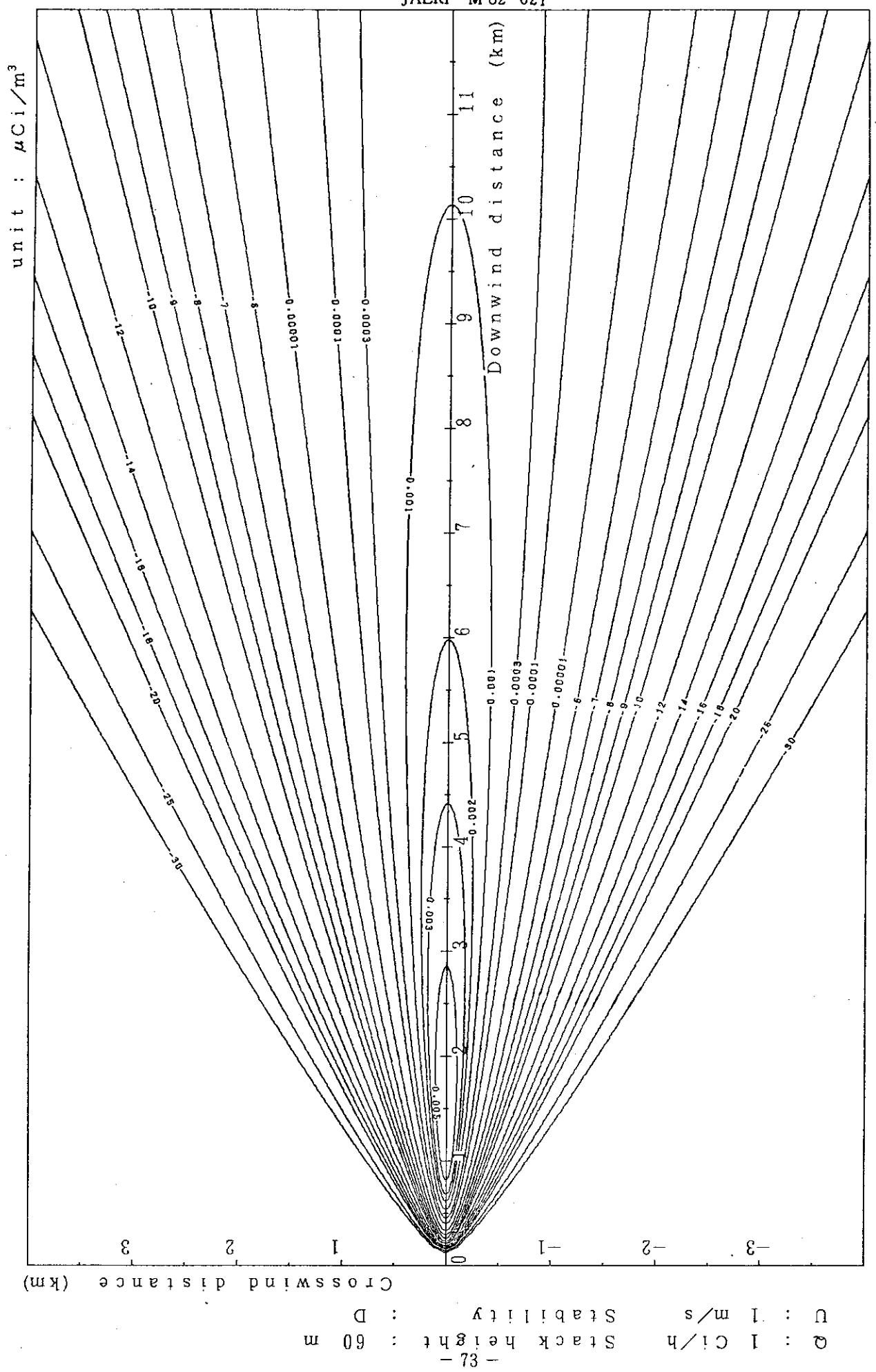


Fig. 2-5-4 (B) Isopleths of surface concentration

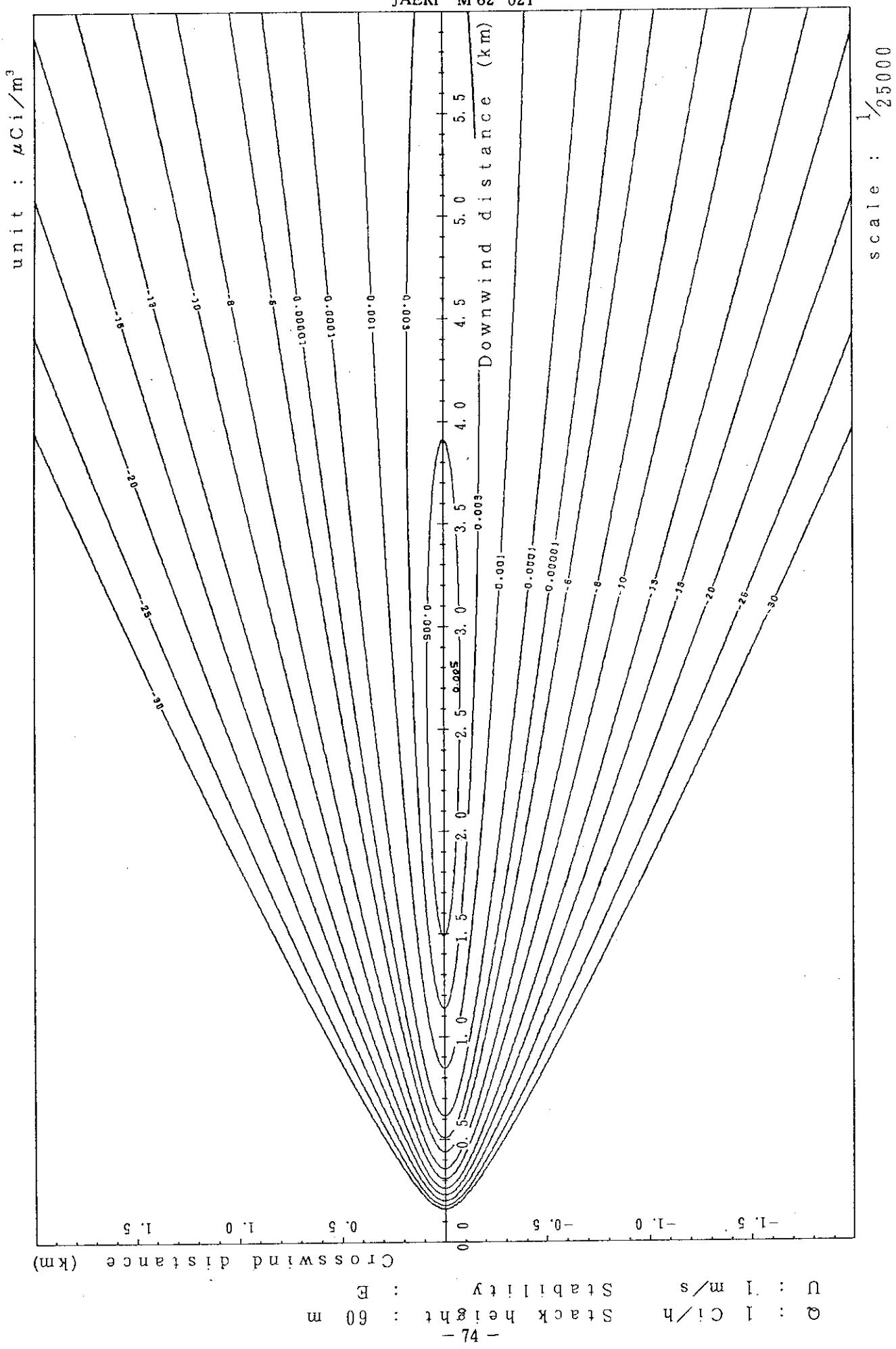


Fig. 2-5-5 (A) Isopleths of surface concentration

JAERI-M 82-021

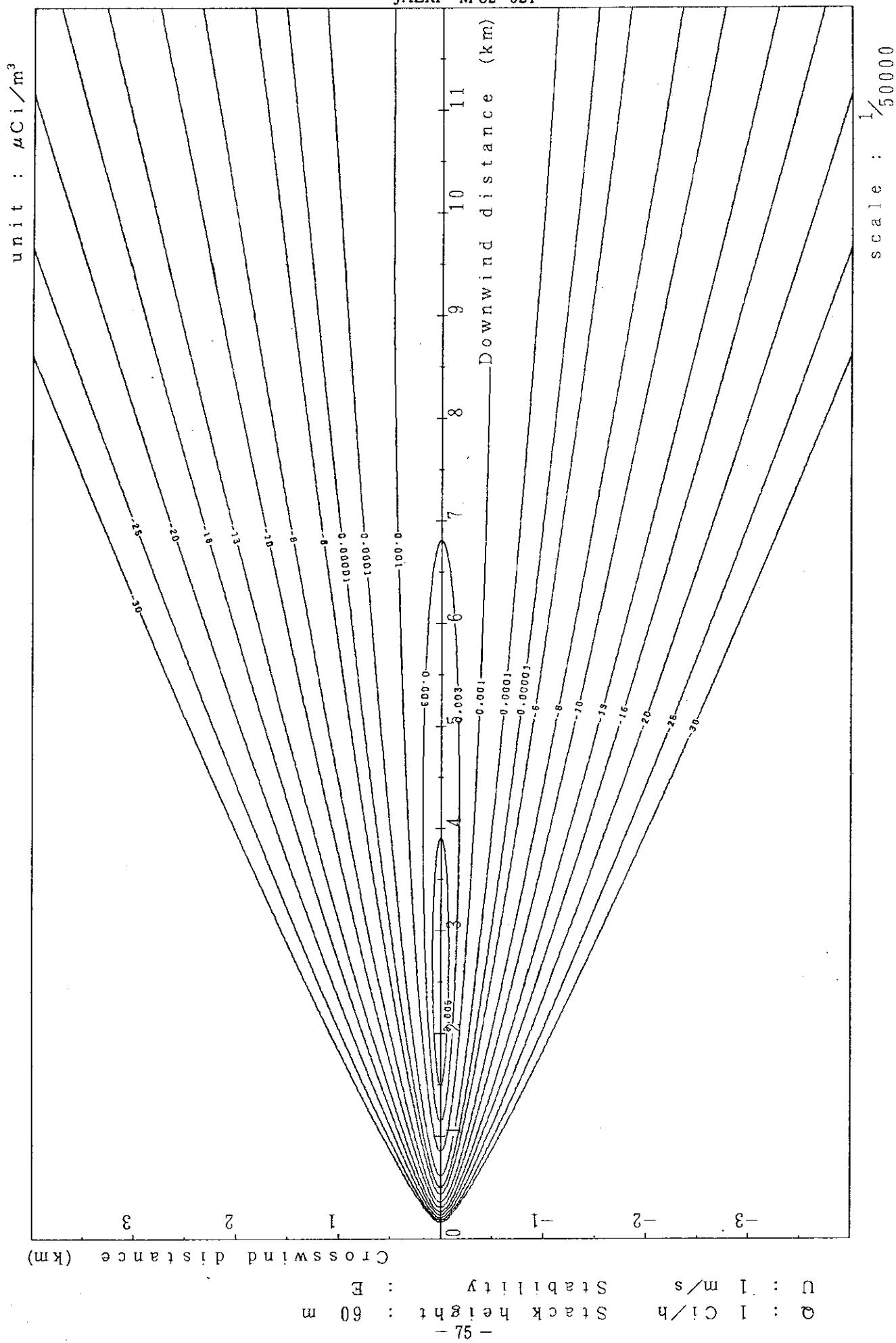


Fig. 2-5-5 (B) Isopleths of surface concentration

scale : 1/50000

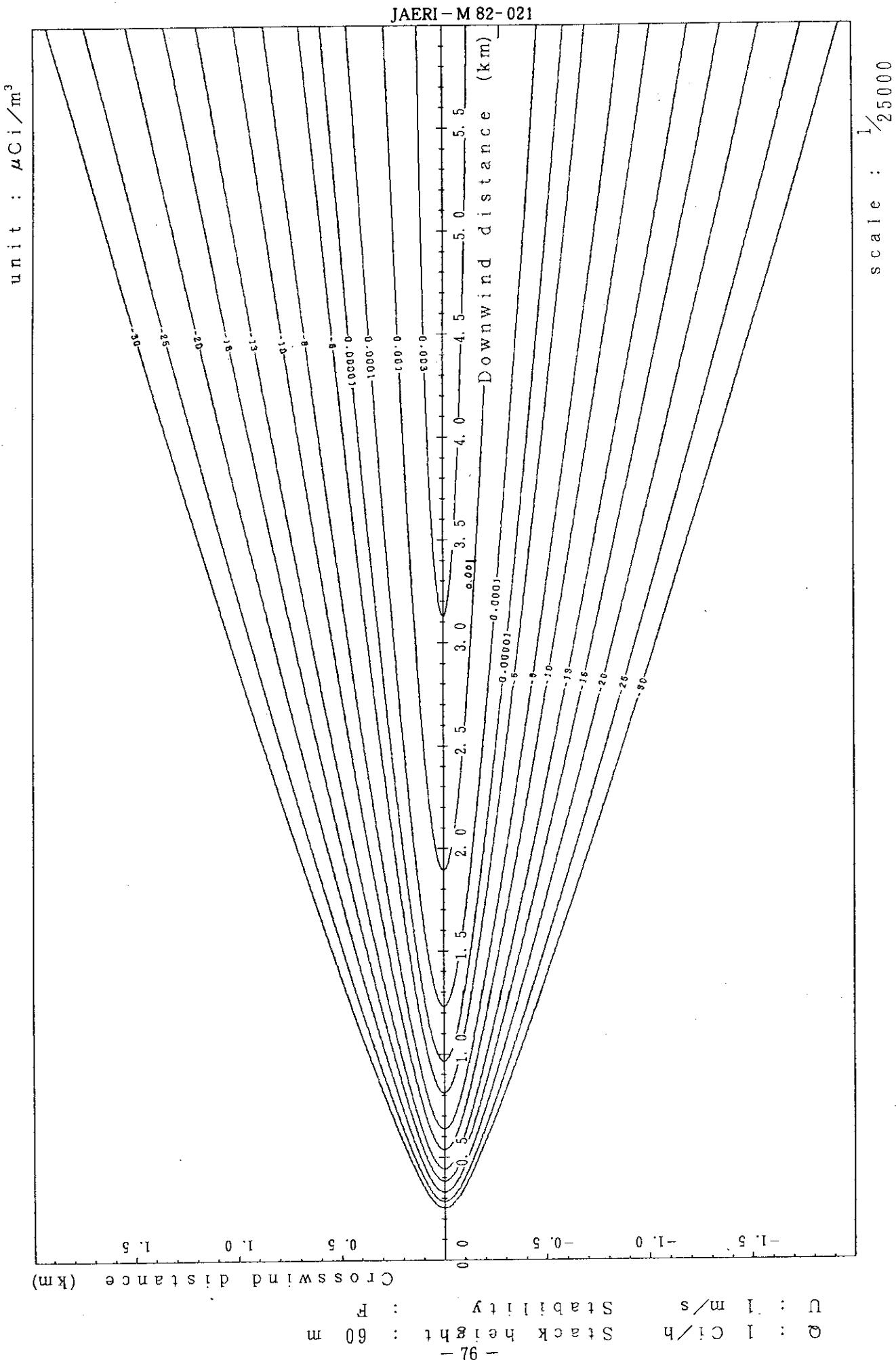


Fig. 2-5-6(A) Isopleths of surface concentration

JAERI - M 82-021

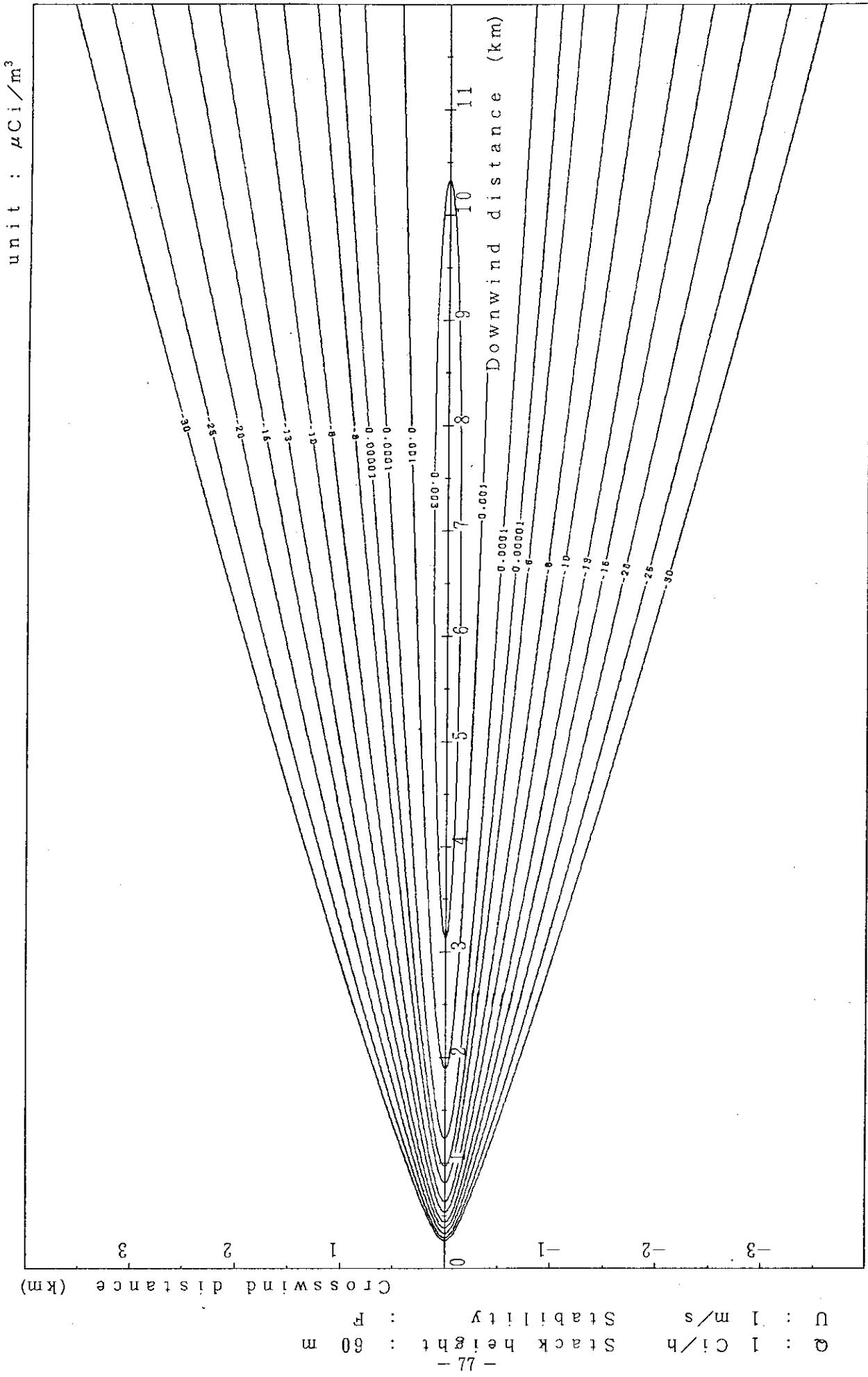


Fig. 2-5-6 (B) Isopleths of surface concentration

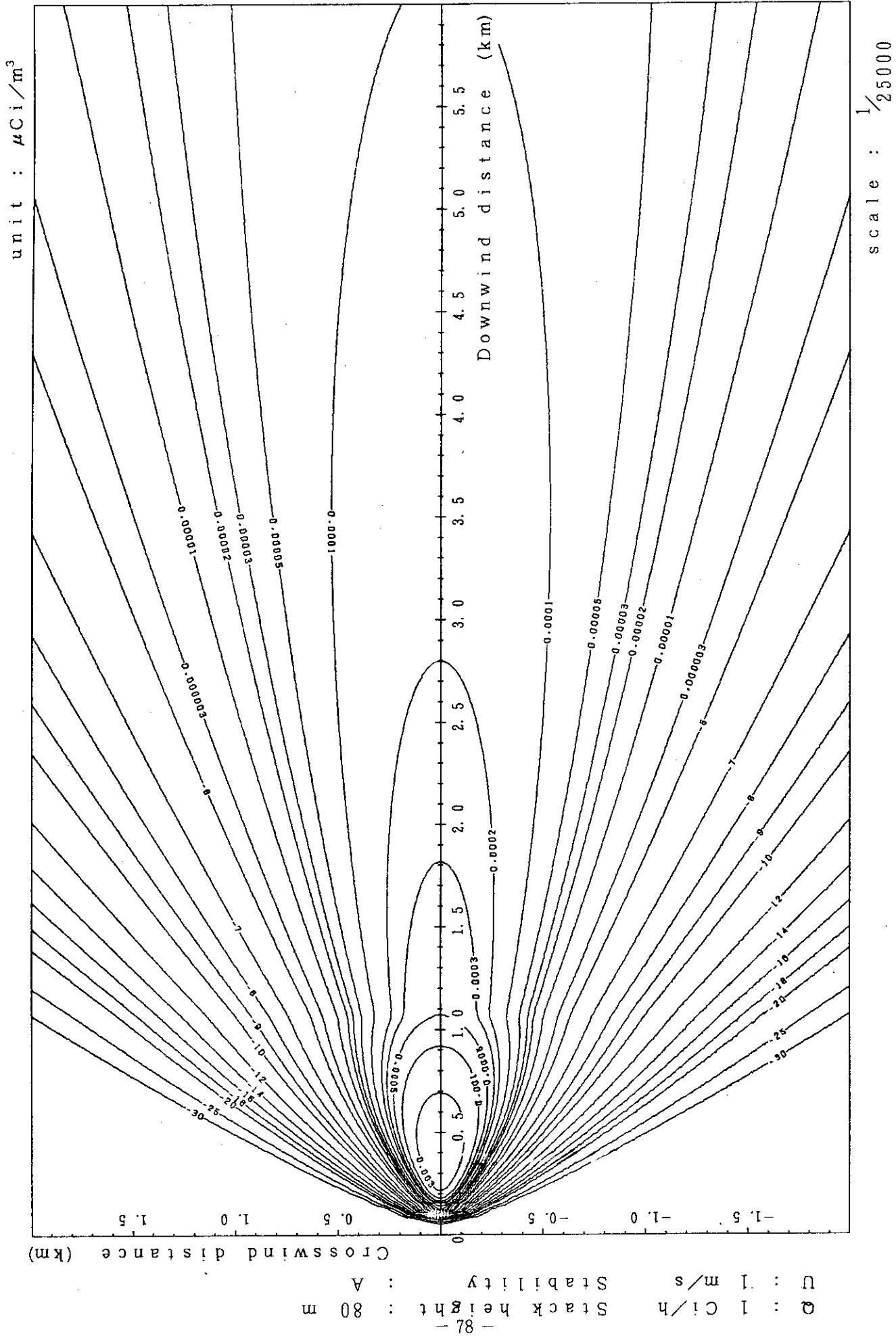


Fig. 2-6-1(A) Isopleths of surface concentration

scale :  $1/25000$

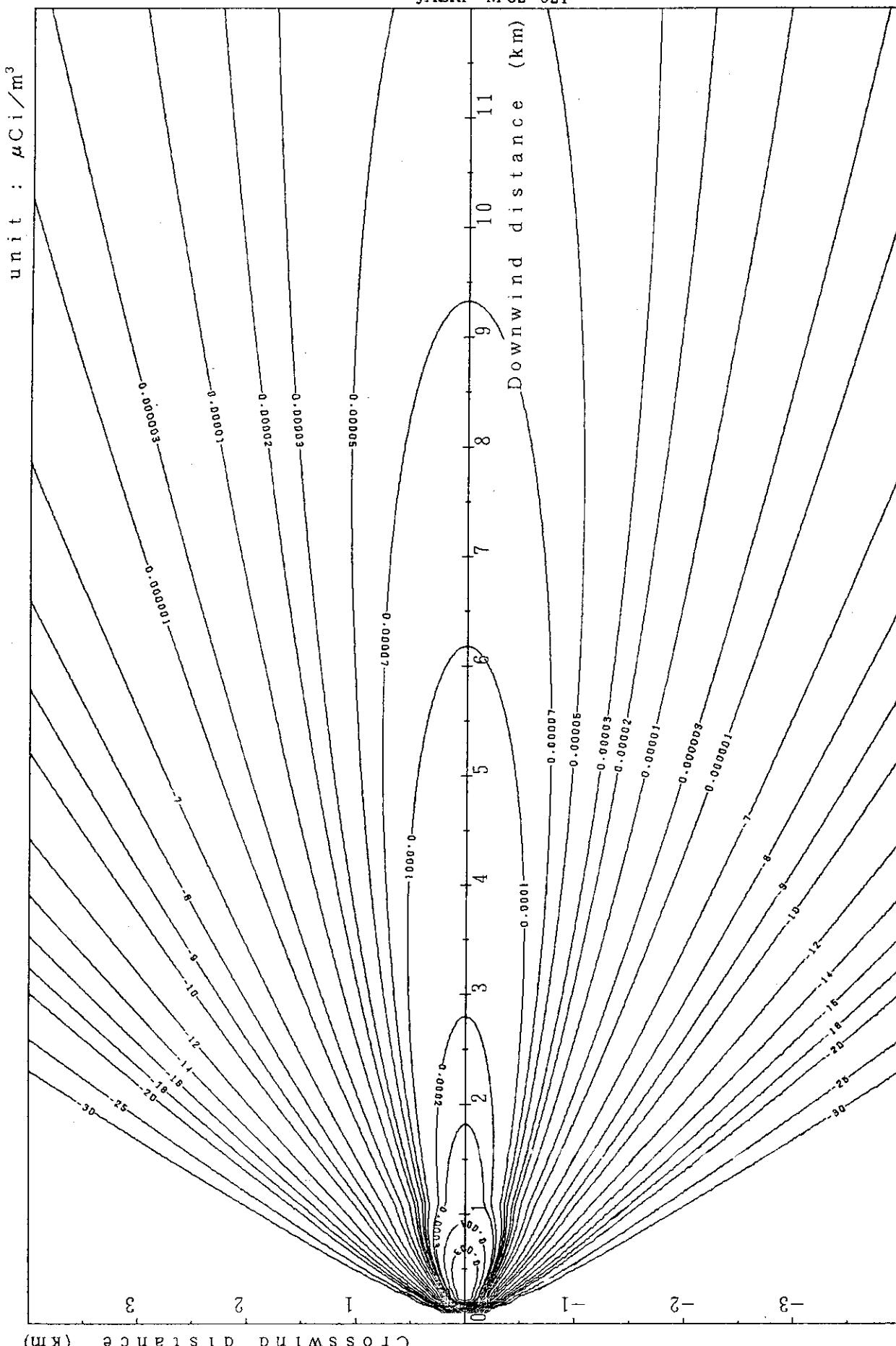


Fig. 2-6-1(B) Isopleths of surface concentration  
scale :  $1/50000$

$Q : 1 \text{ Ci/h}$  Stack height : 80 m  
 $U : 1 \text{ m/s}$  Stability : A  
- 67 -

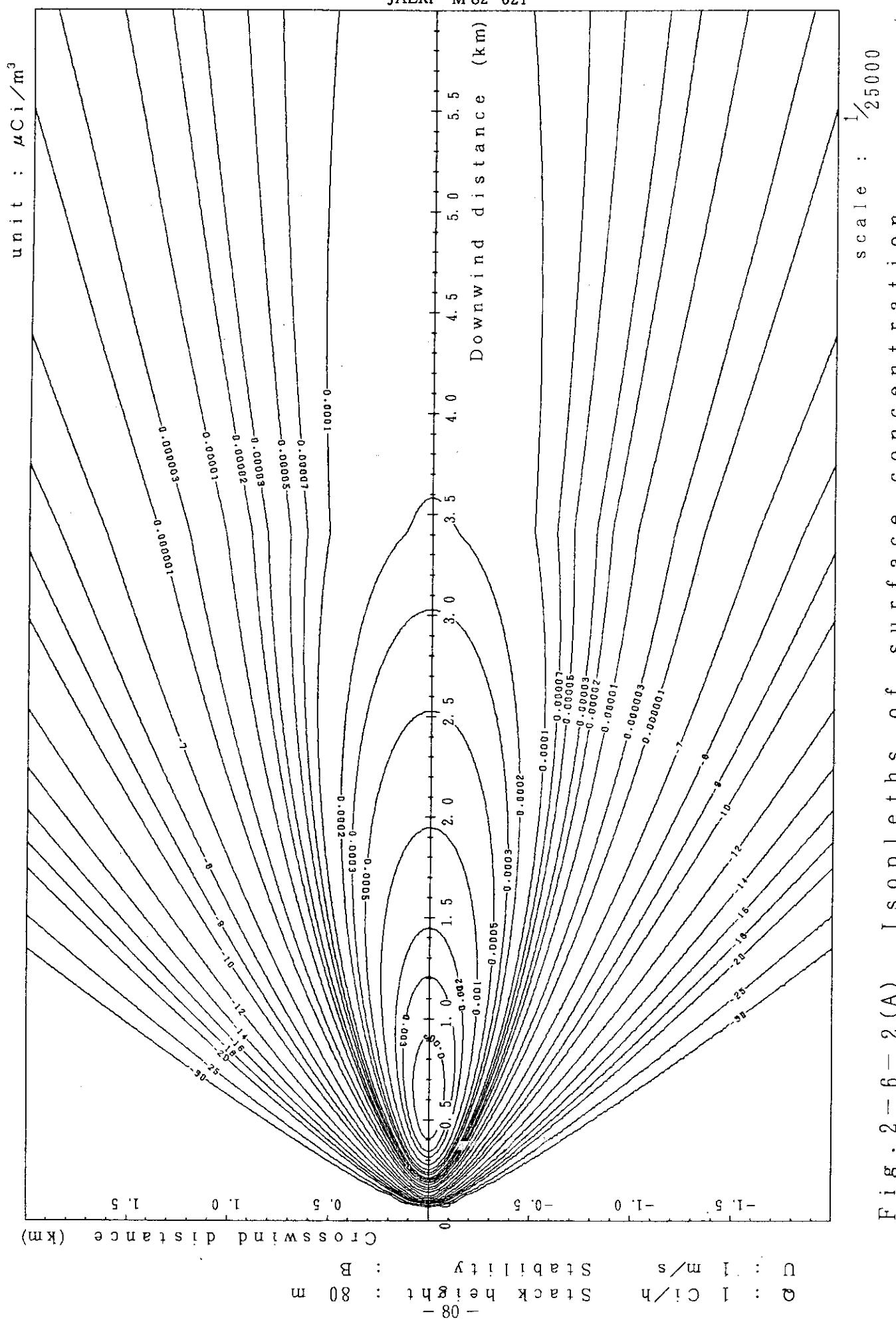


Fig. 2-6-2 (A) Isopleths of surface concentration

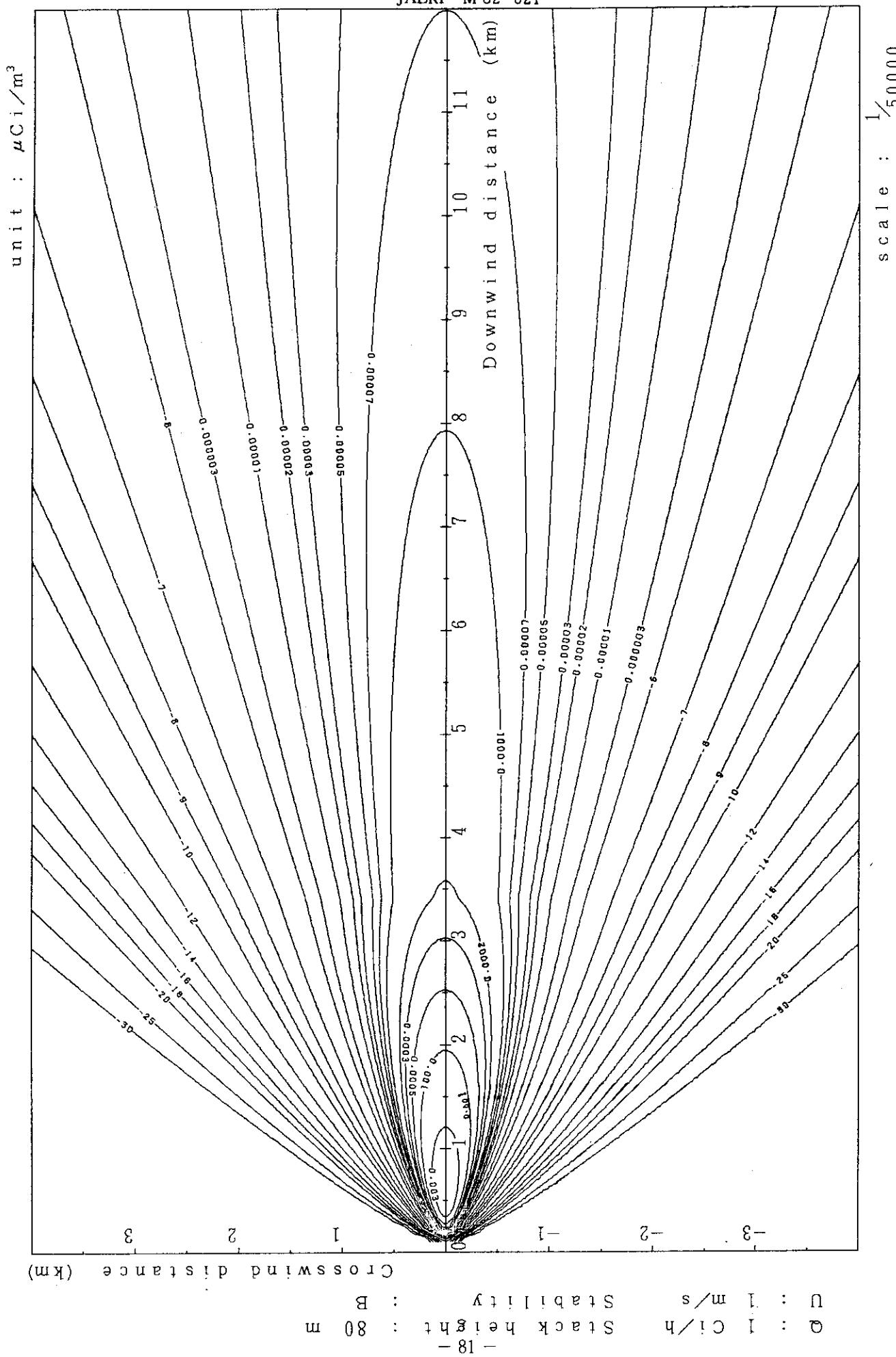


Fig. 2-6-2 (B) Isopleths of surface concentration

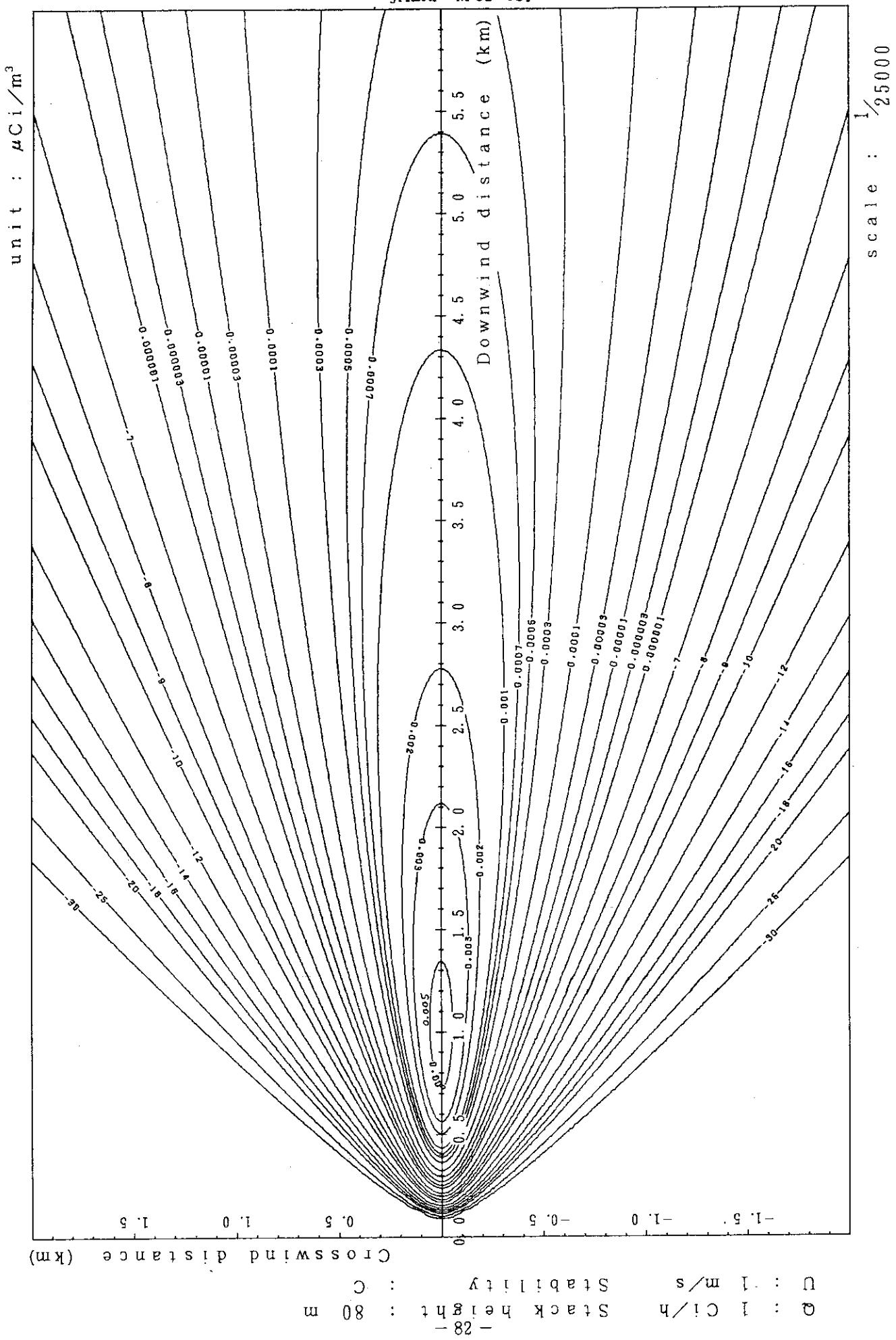
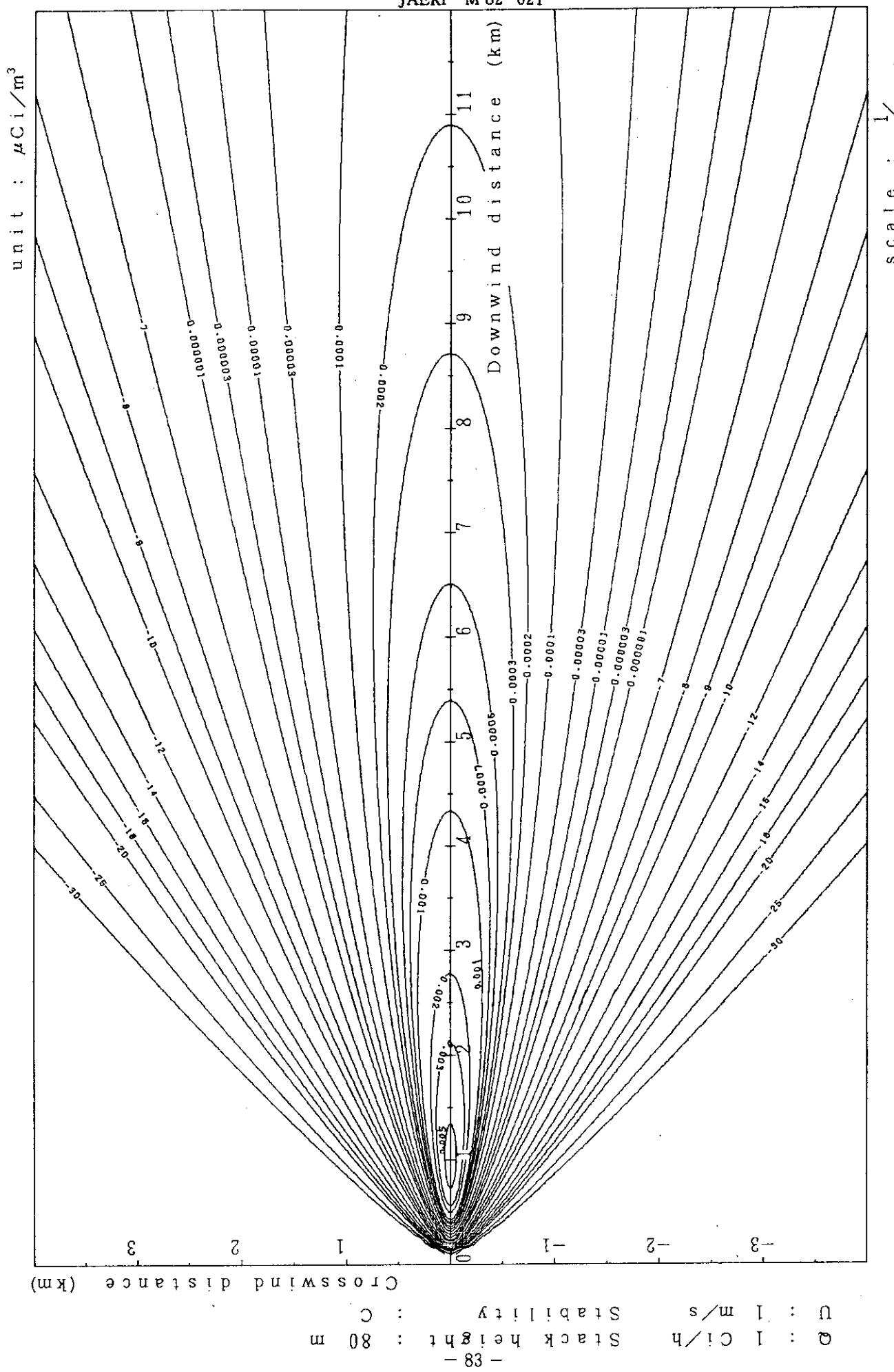


Fig. 2-6-3(A) Isopleths of surface concentration



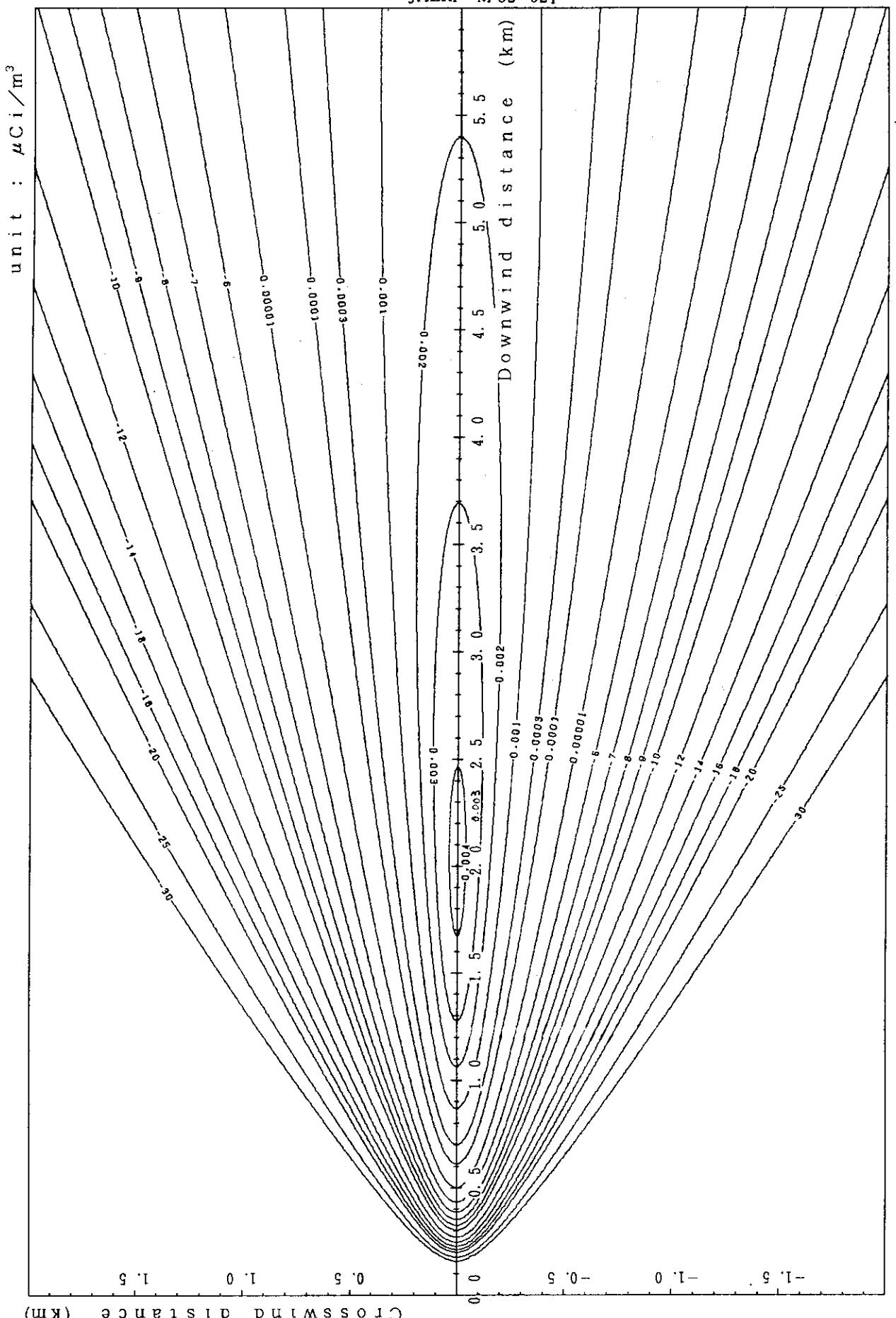


Fig. 2-6-4(A) Isopleths of surface concentration

$Q : 1 \text{ Ci/h}$  Stack height : 80 m  
 $U : 1 \text{ m/s}$  Stability : D

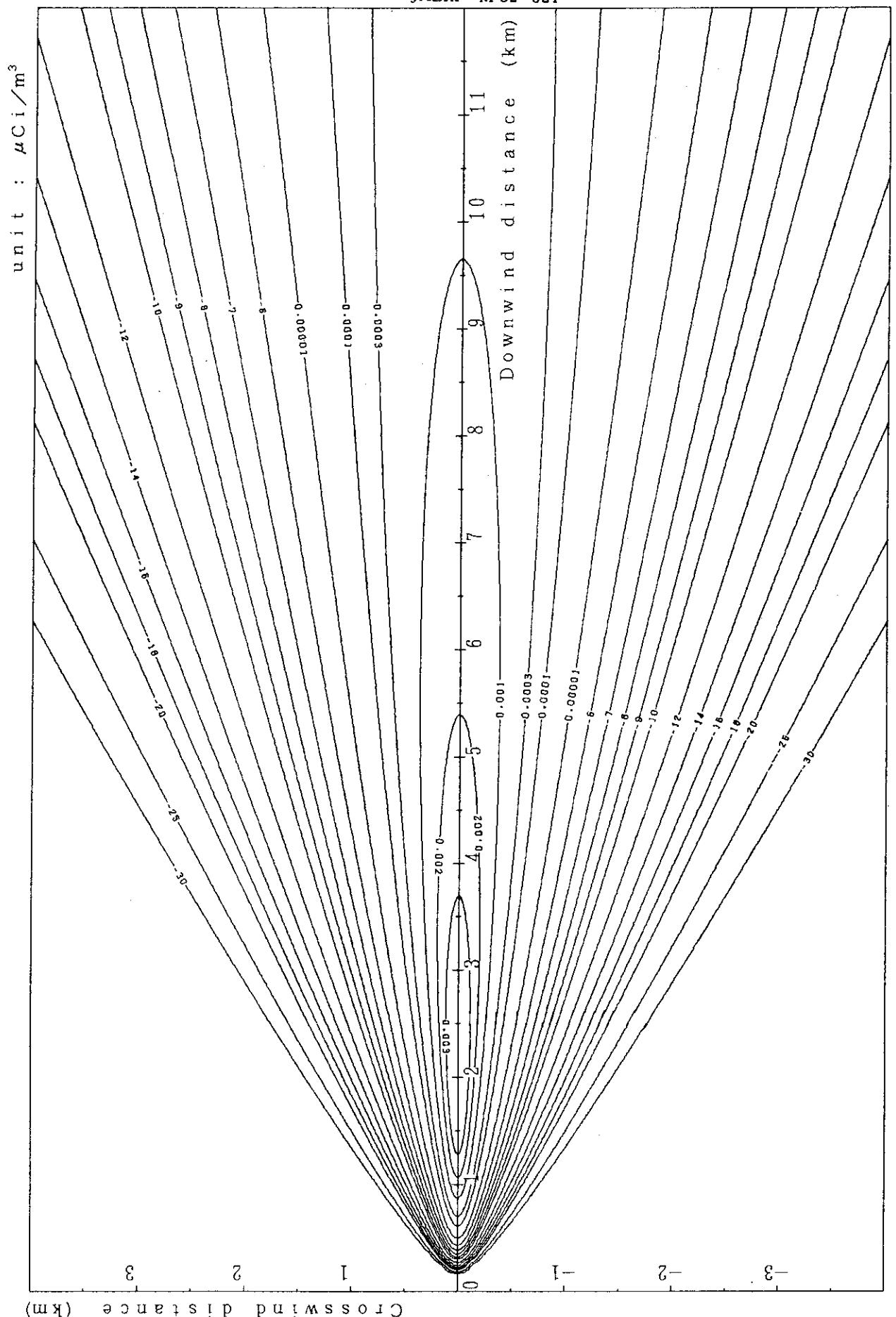


Fig. 2-6-4(B) Isopleths of surface concentration

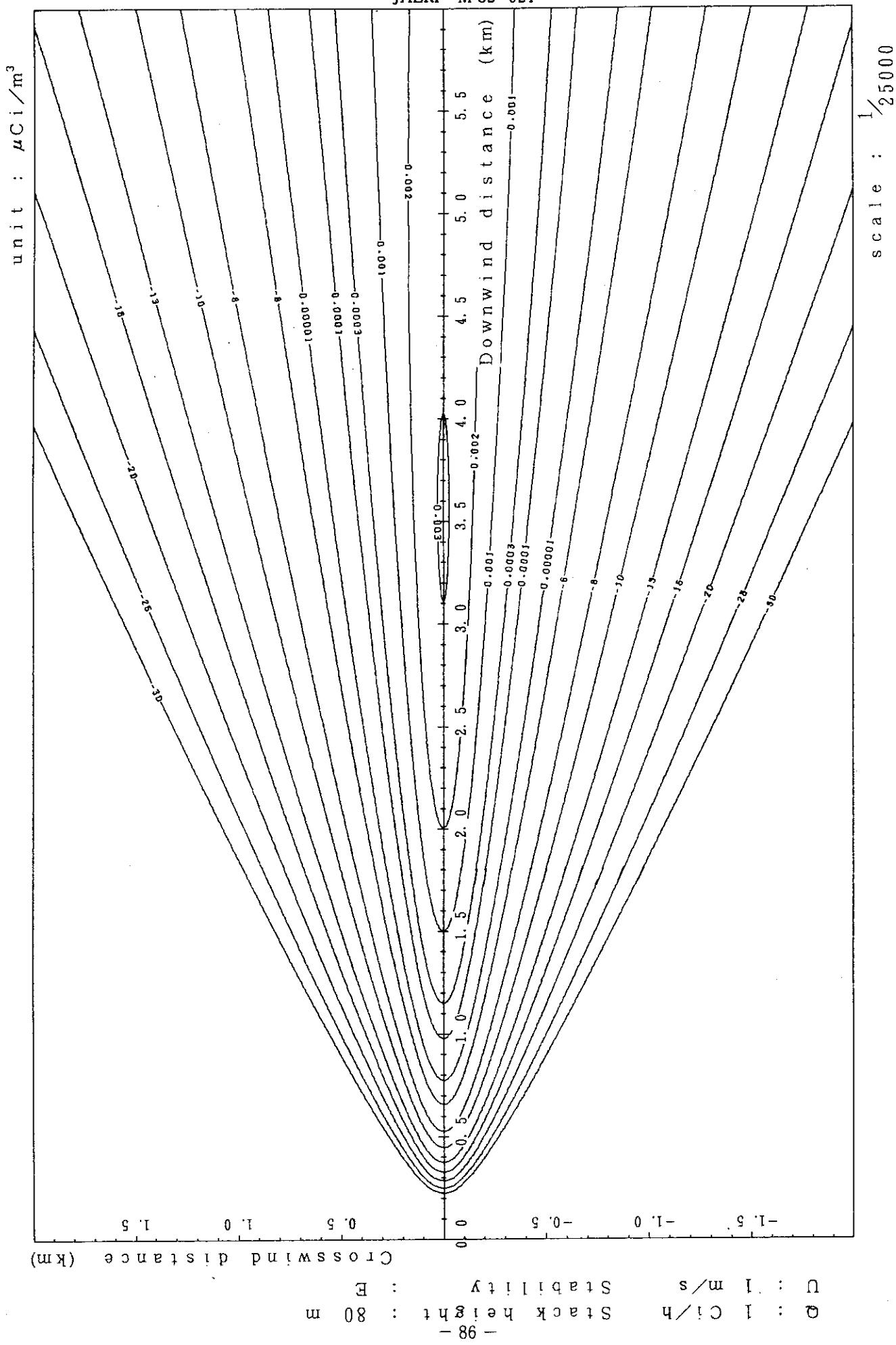


Fig. 2-6-5 (A) Isopleths of surface concentration

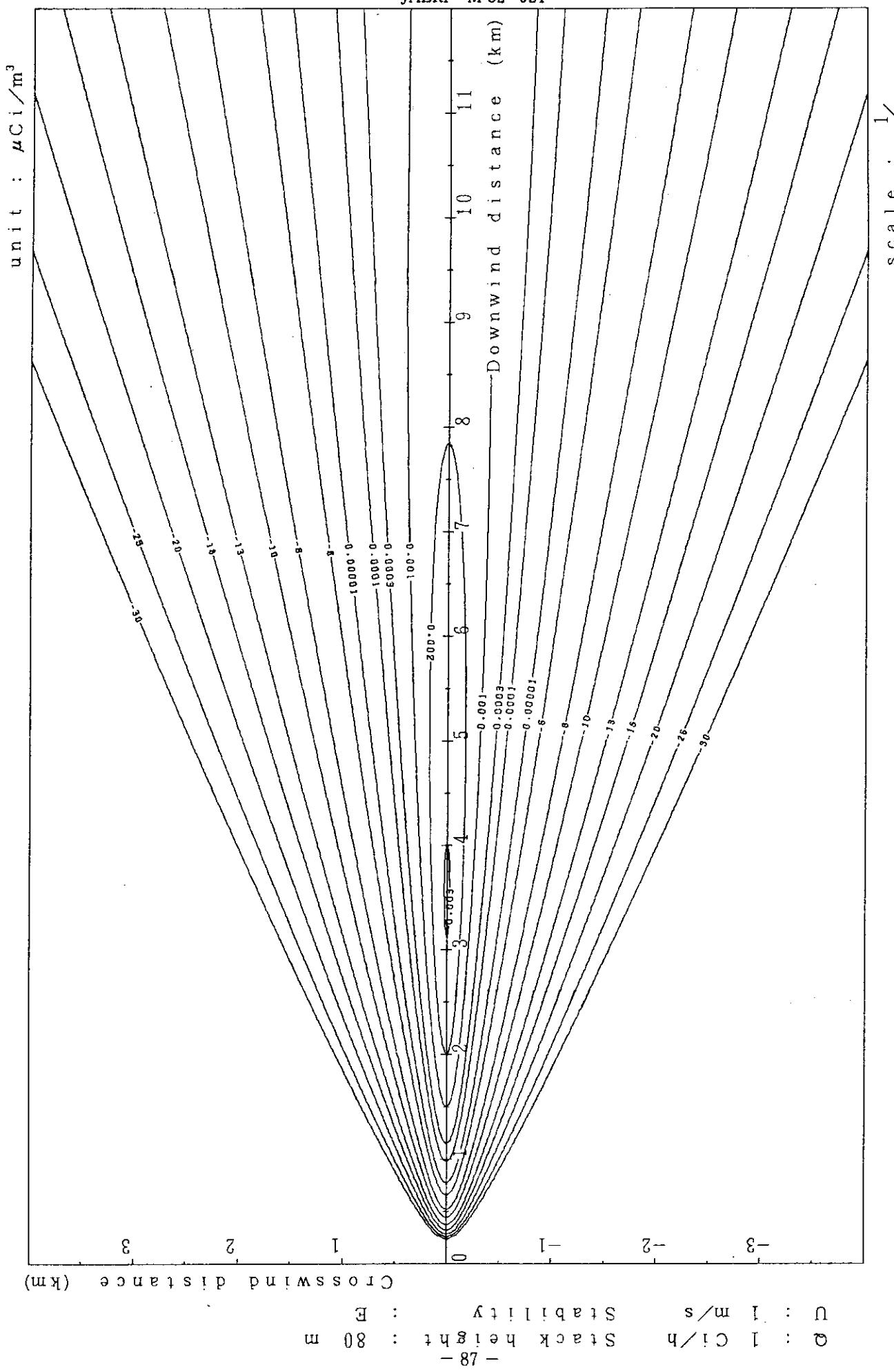


Fig. 2-6-5(B) Isopleths of surface concentration

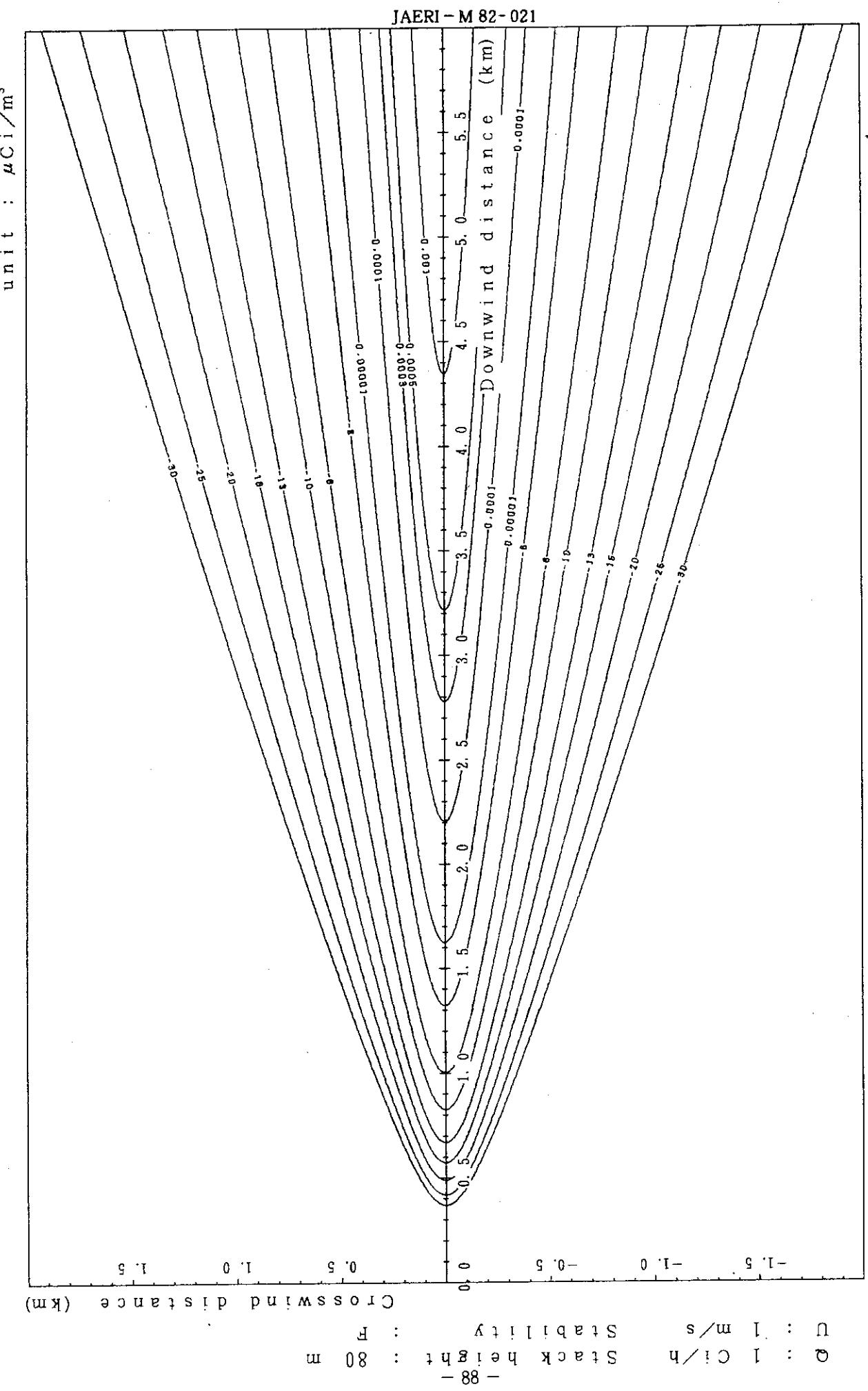


Fig. 2-6(A) Isopleths of surface concentration  
scale :  $1/25000$

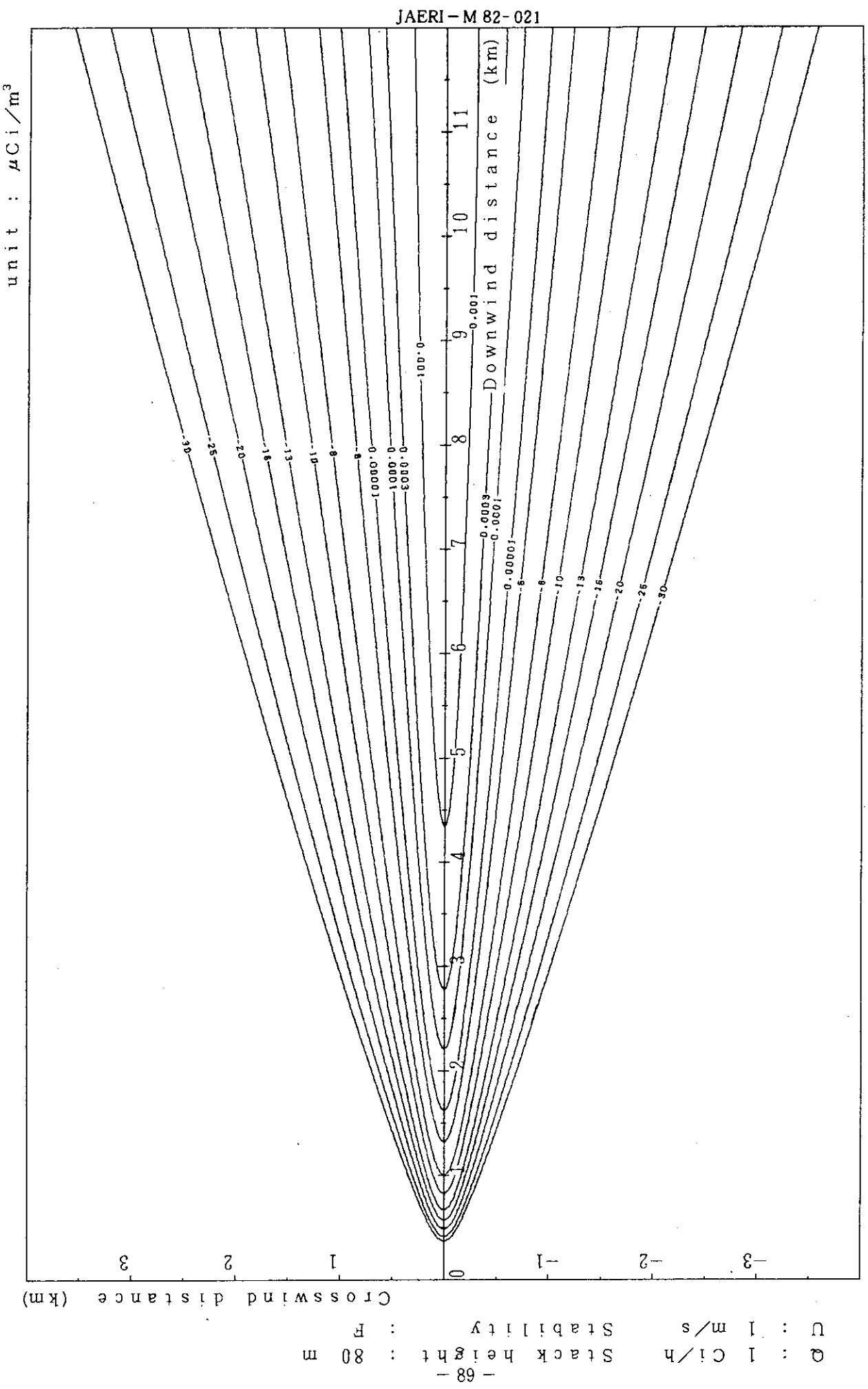


Fig. 2-6-6 (B) Isopleths of surface concentration

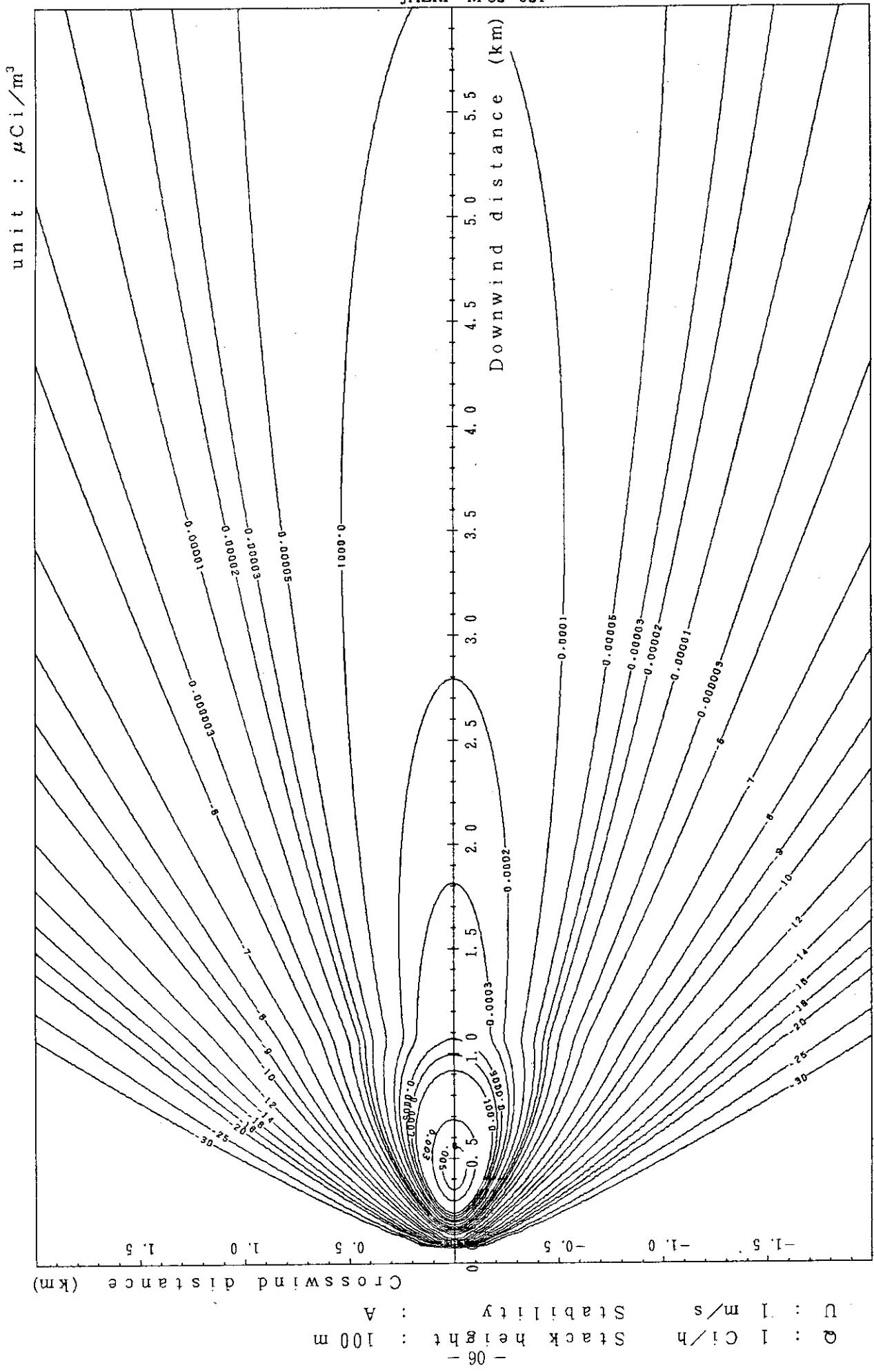


Fig. 2-7-1(A) Isopleths of surface concentration

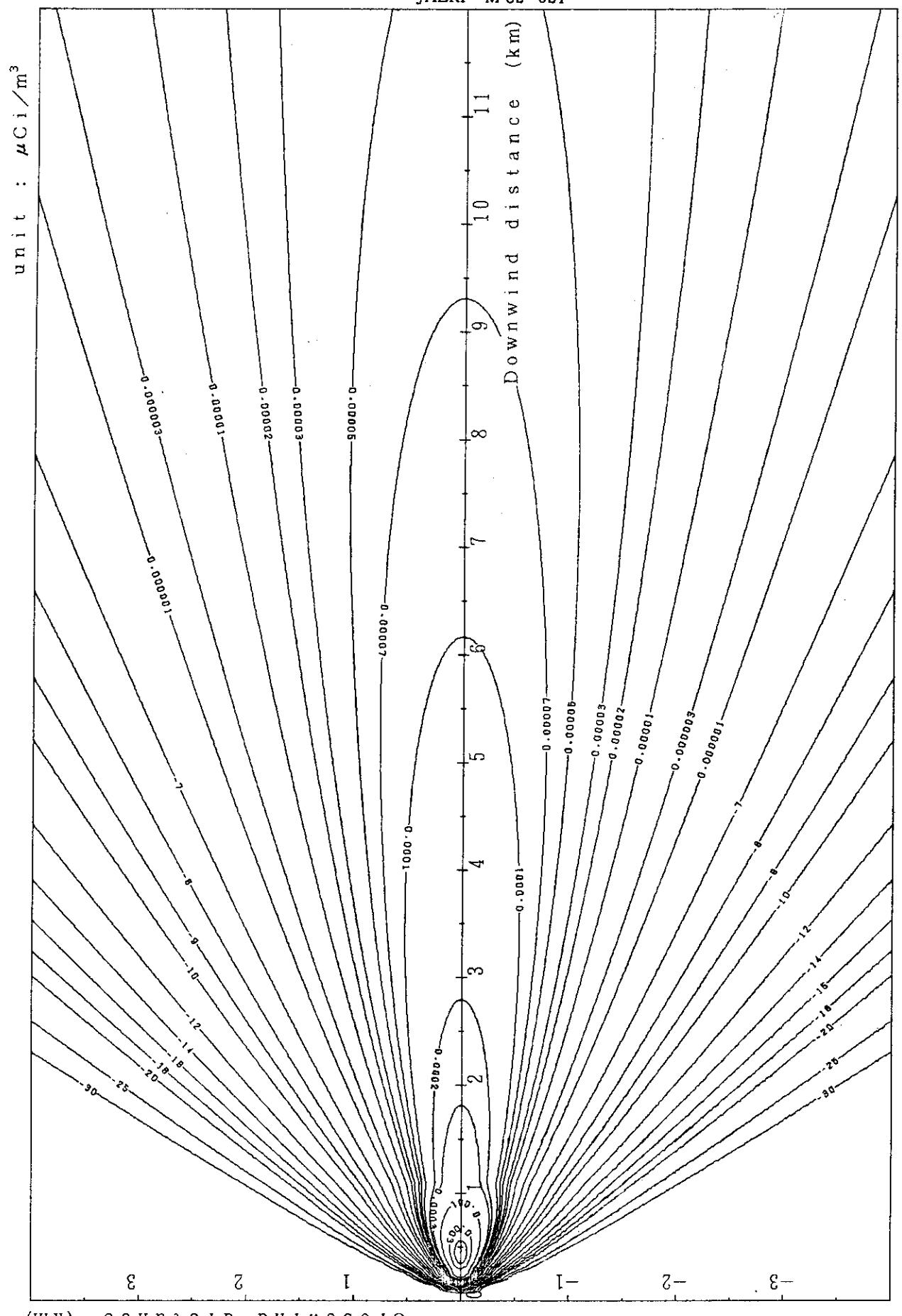


Fig. 2-7-1(B) Isopleths of surface concentration  
scale :  $1/50000$

$Q : 1 \text{ Ci/h}$  Stack height : 100 m Stability : A

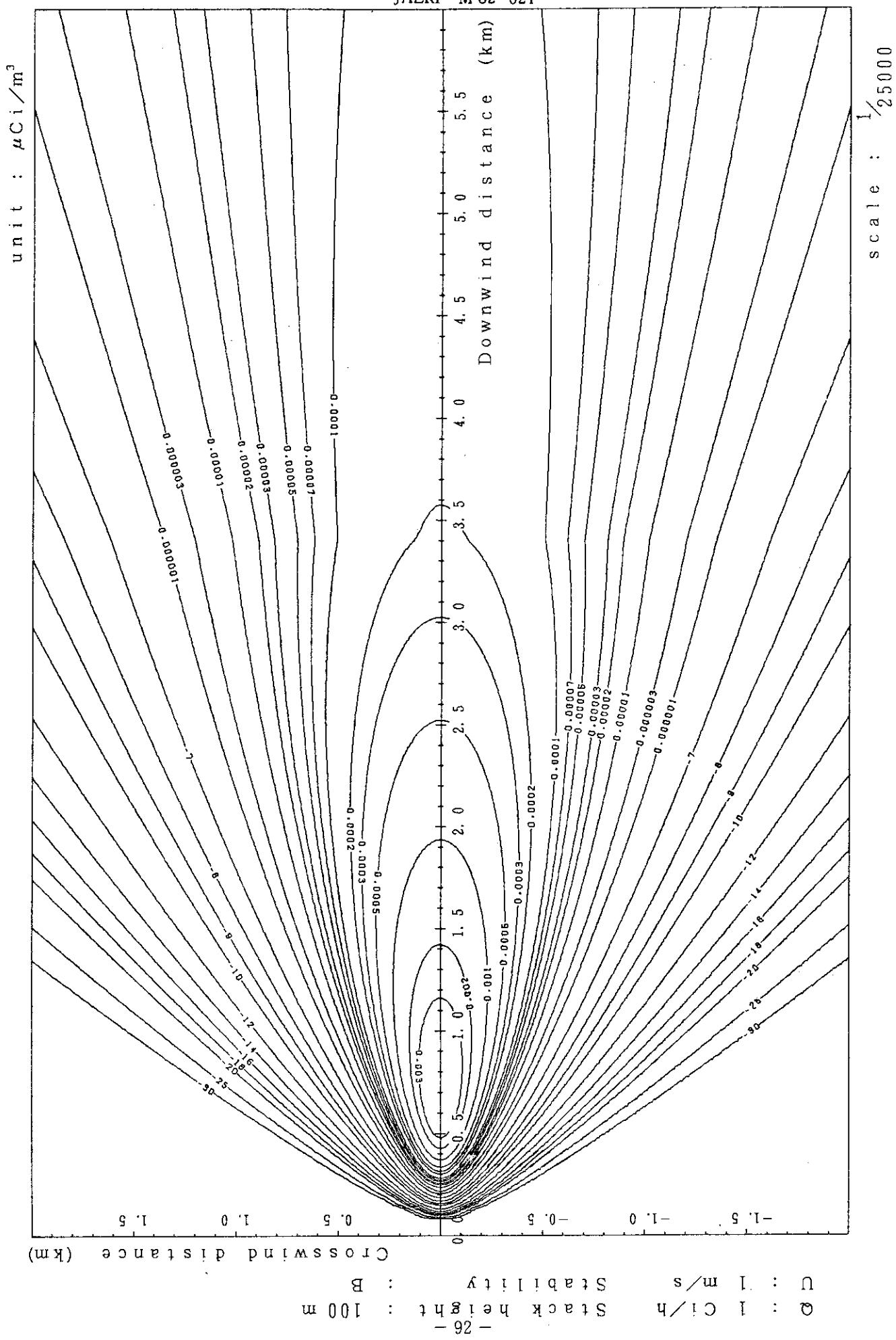


Fig. 2-7-2 (A) Isopleths of surface concentration

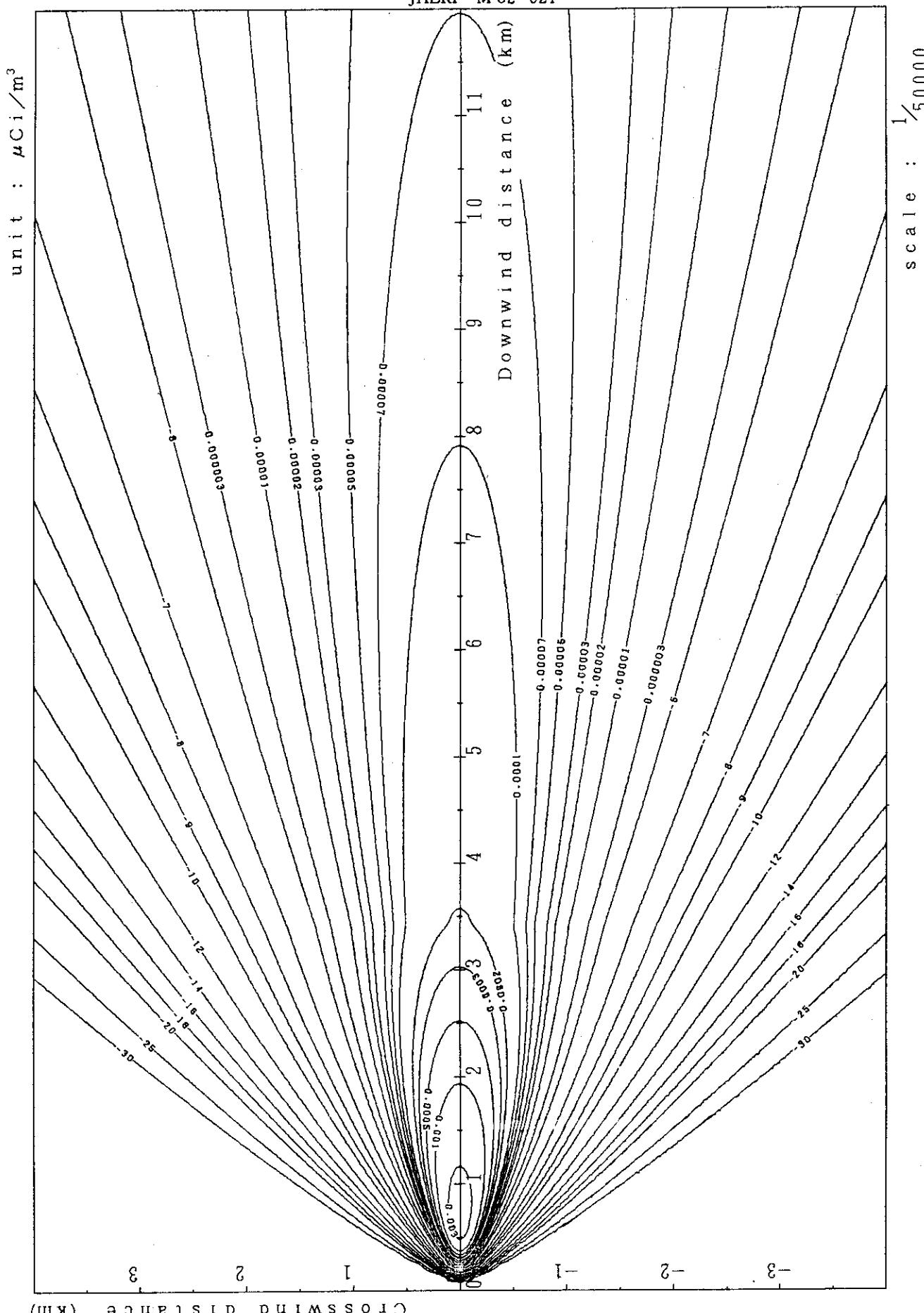


Fig. 2-7-2 (B) Isopleths of surface concentration

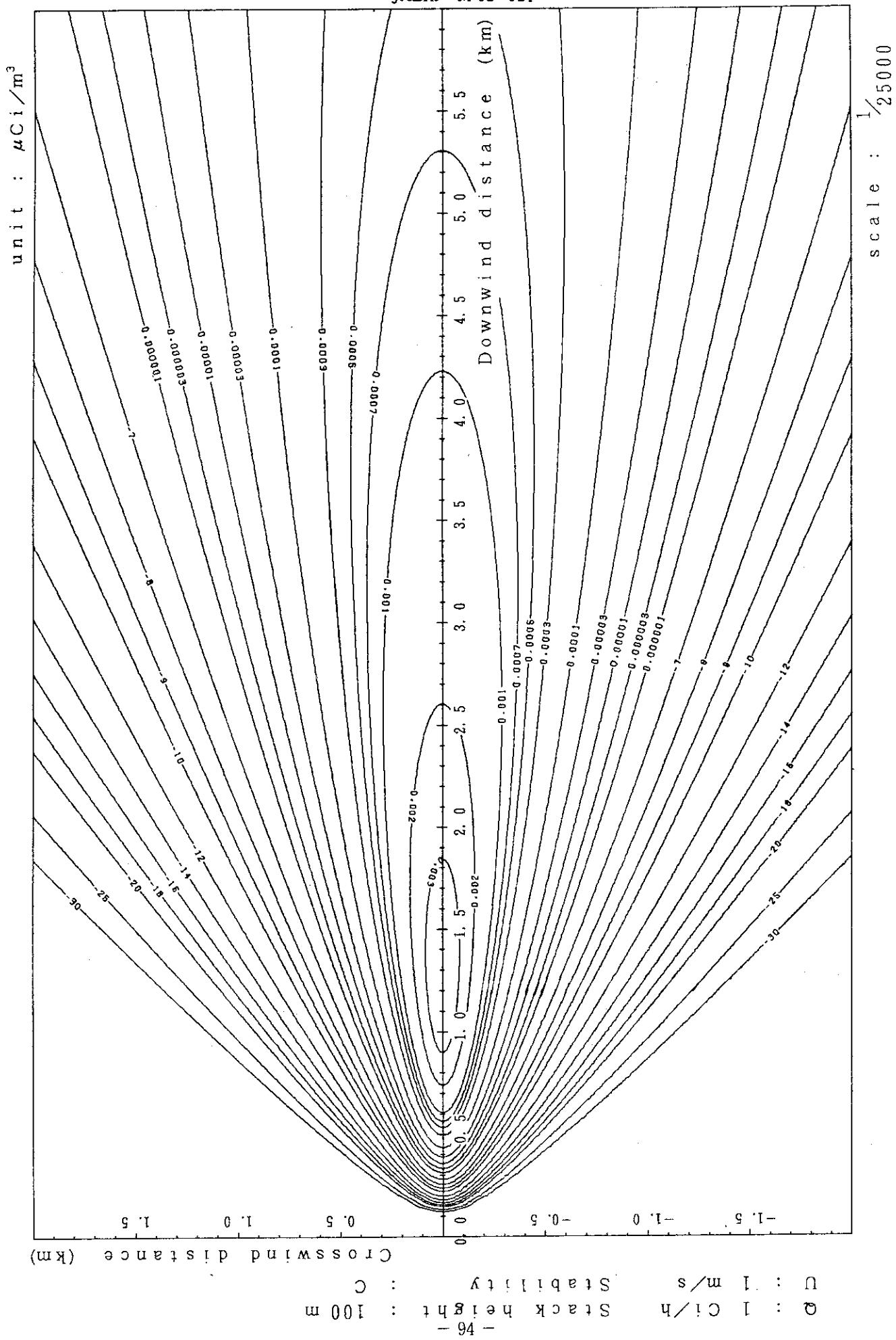


Fig. 2-7-3(A) Isopleths of surface concentration

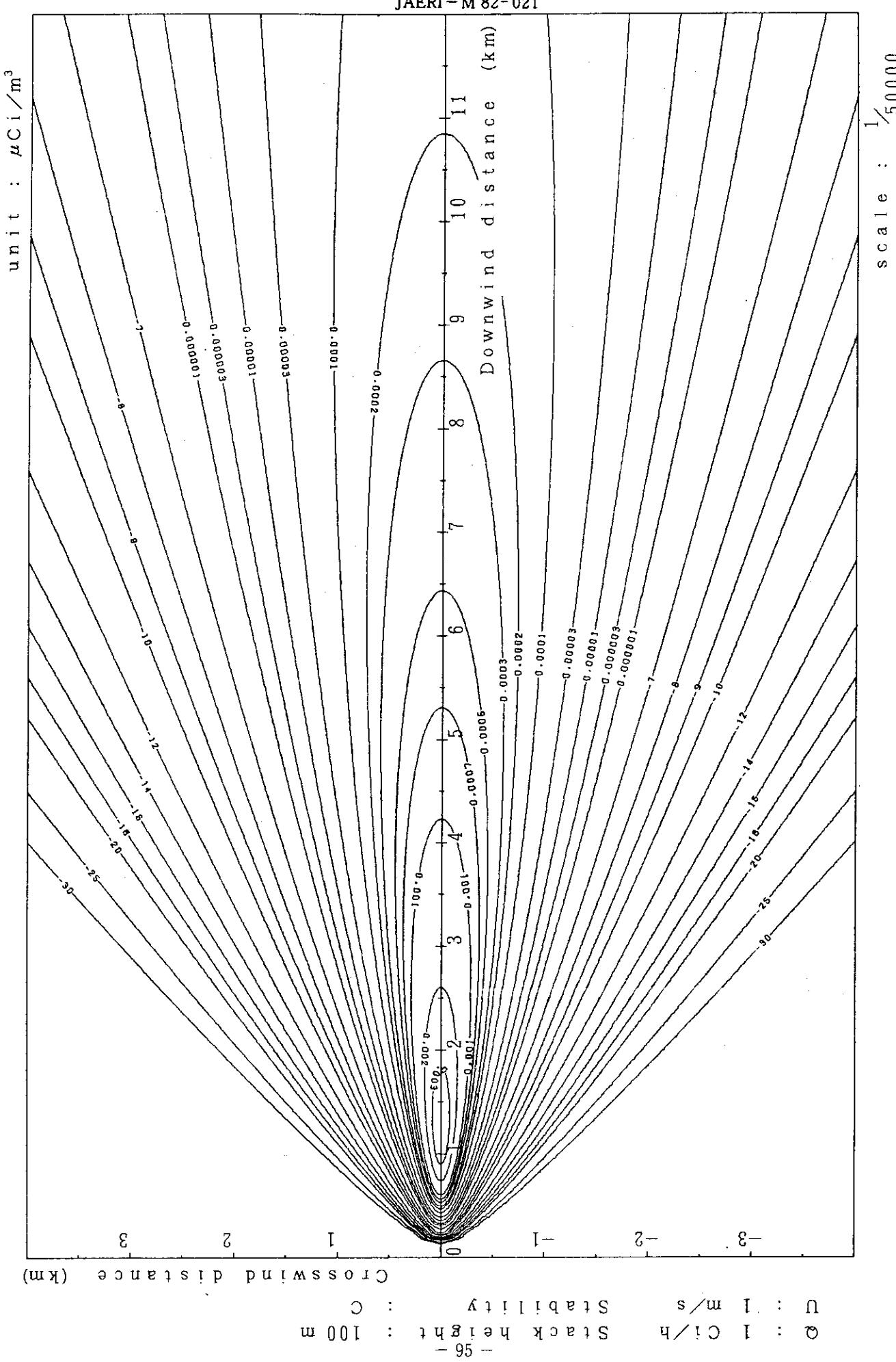


Fig. 2-7-3(B) Isopleths of surface concentration

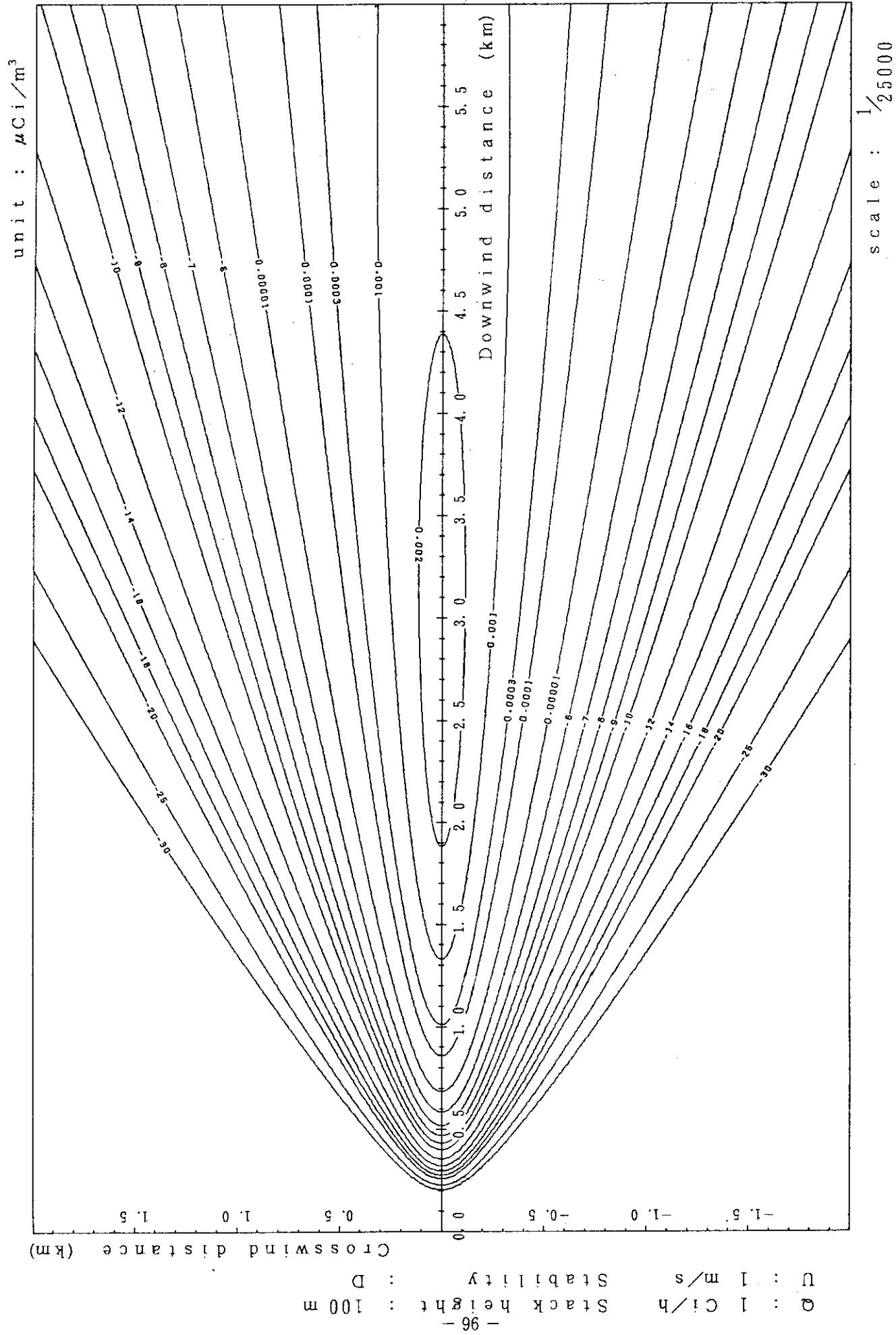


Fig. 2-7-4 (A) Isopleths of surface concentration

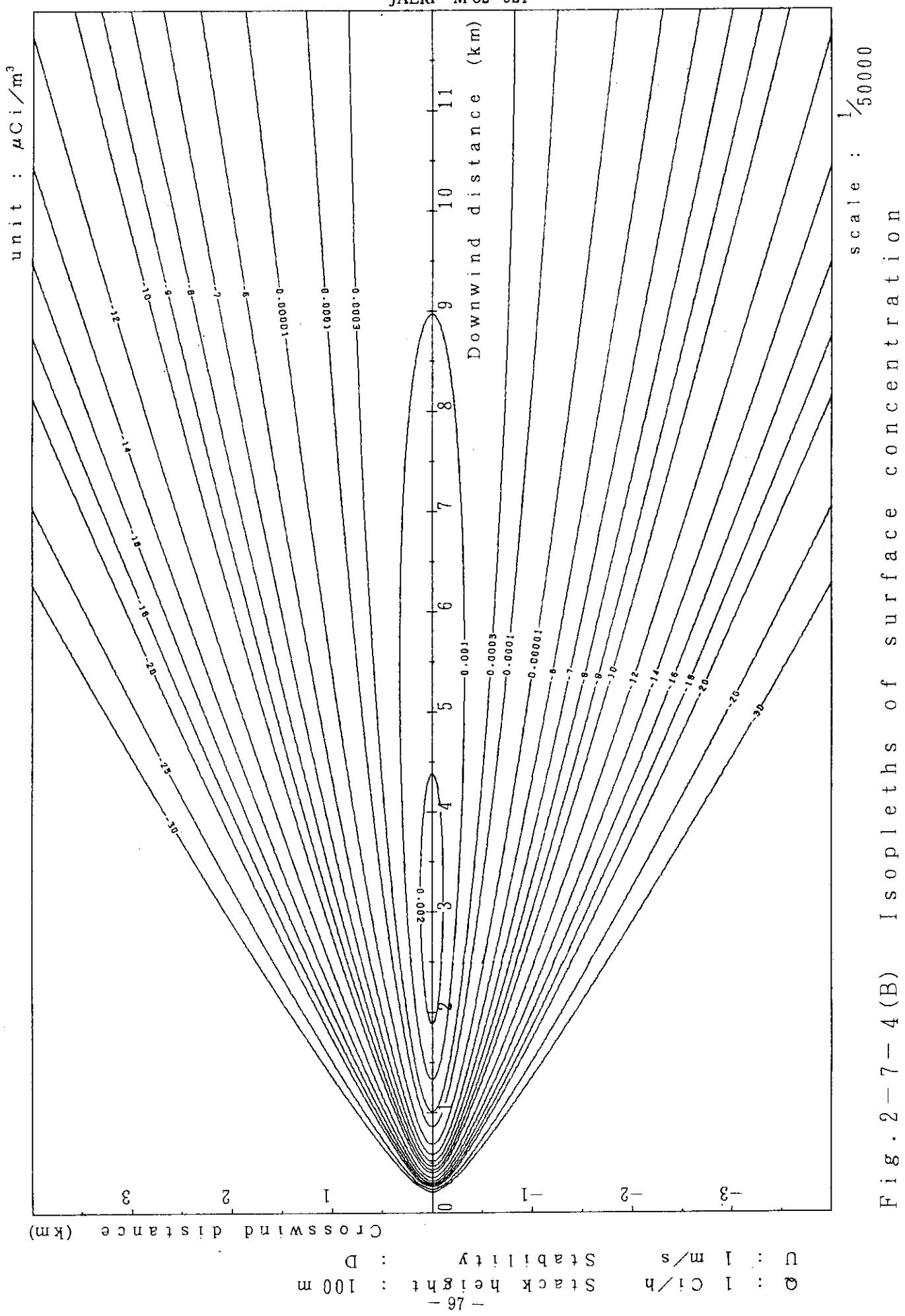


Fig. 2-7-4 (B)

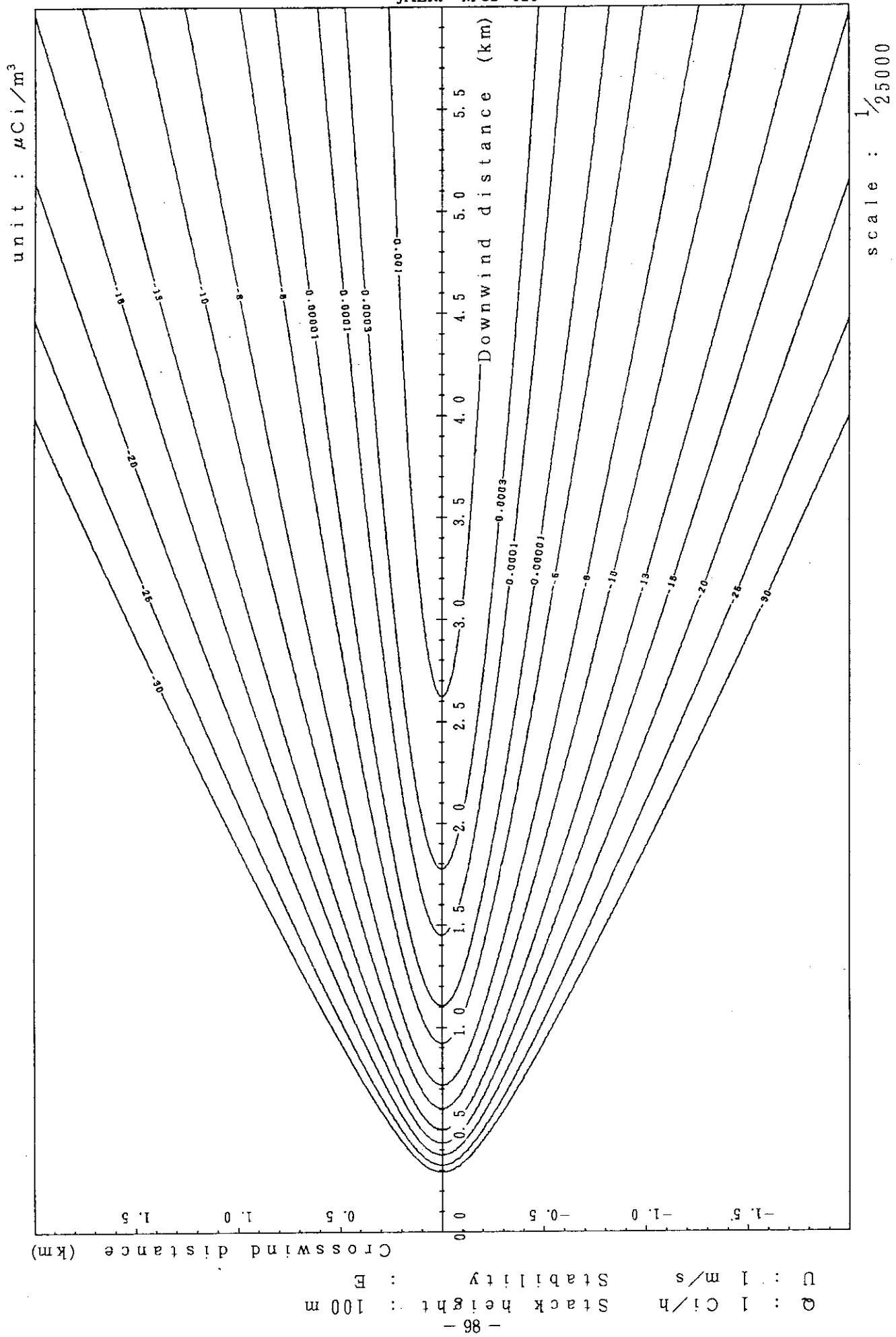


Fig. 2-7-5 (A) Isopleths of surface concentration

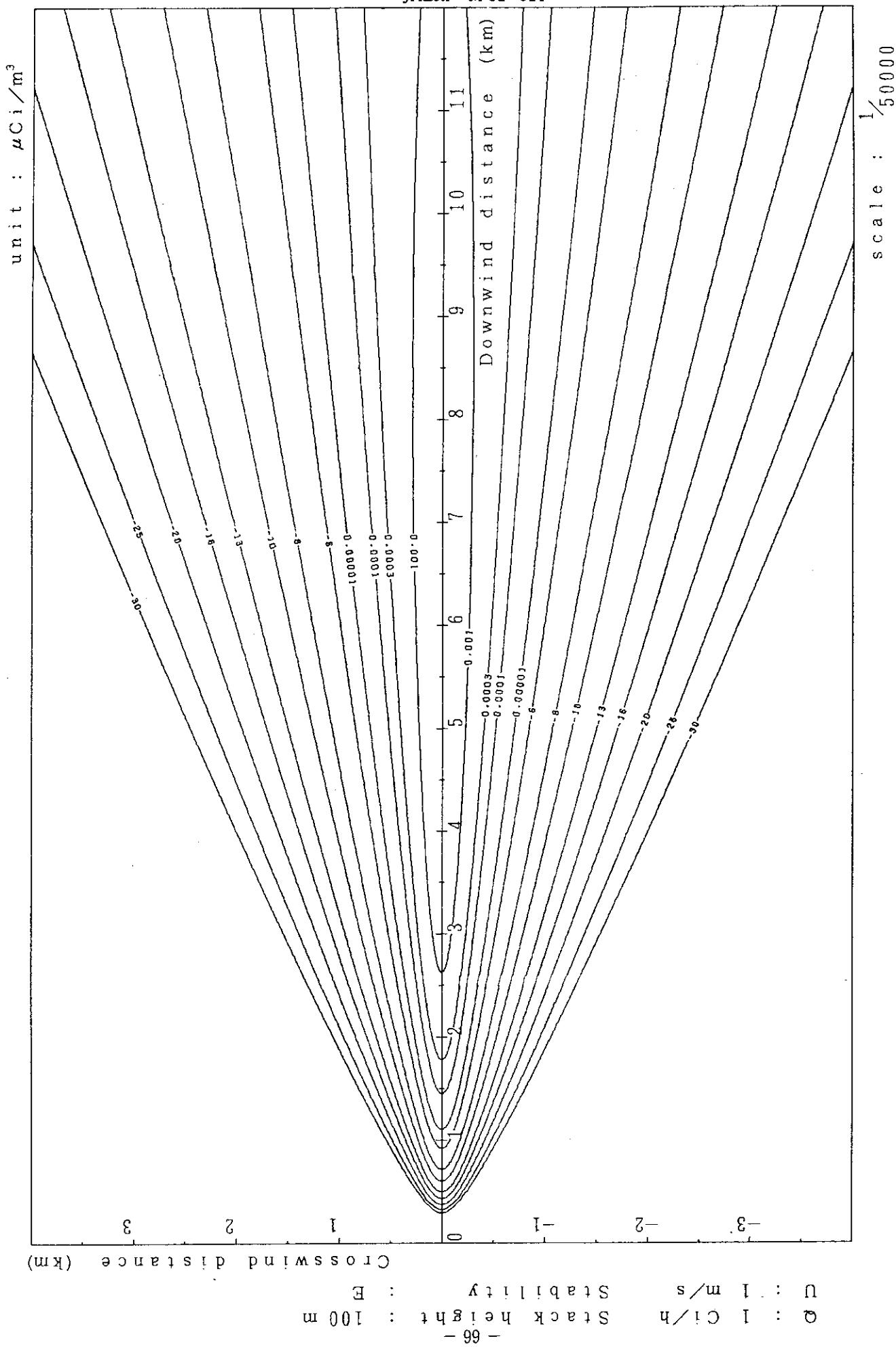


Fig. 2-7-5(B) Isopleths of surface concentration

scale :  $1/50000$

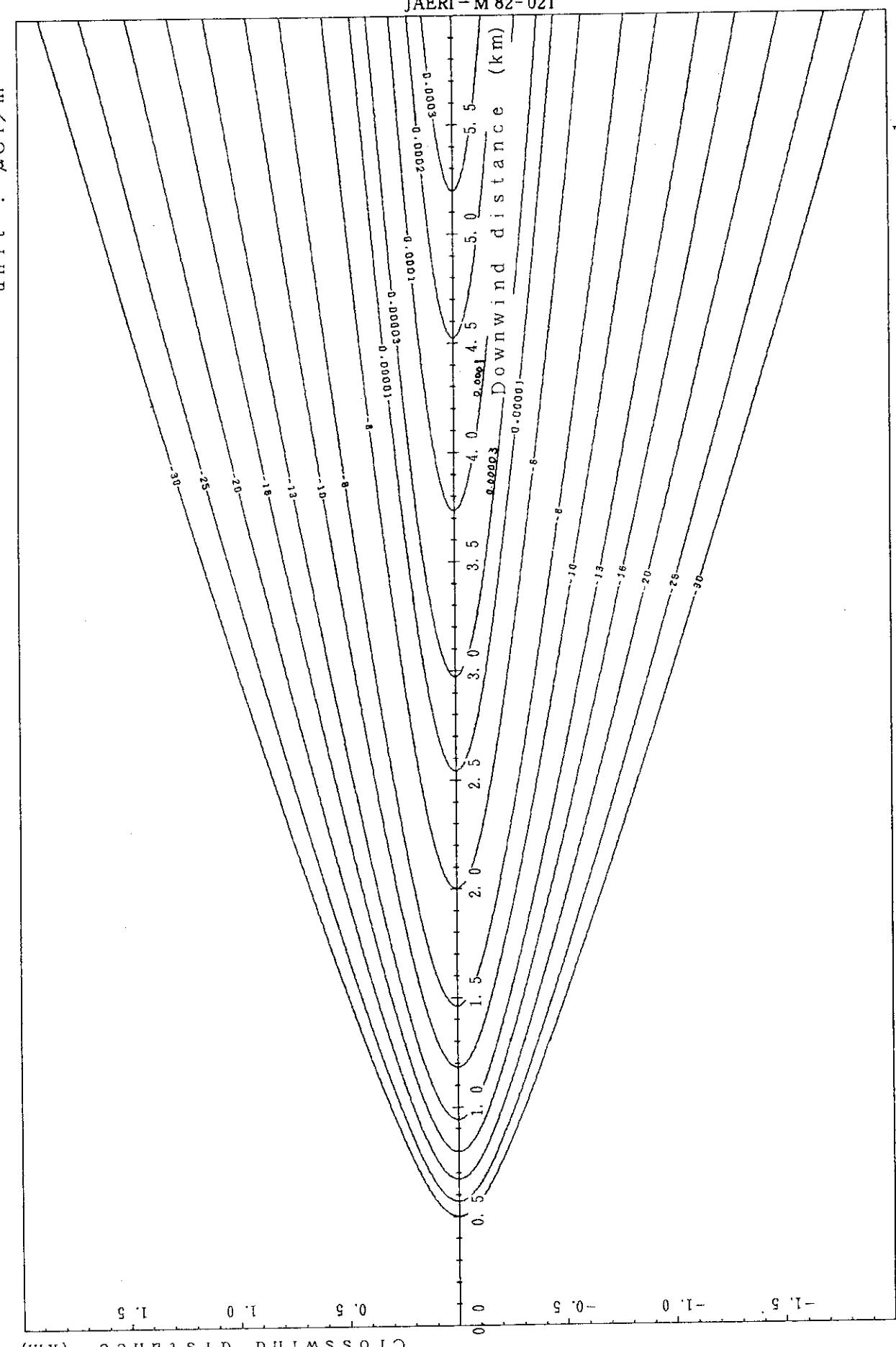


Fig. 2-7-6(A) Isopleths of surface concentration

JAERI - M 82-021

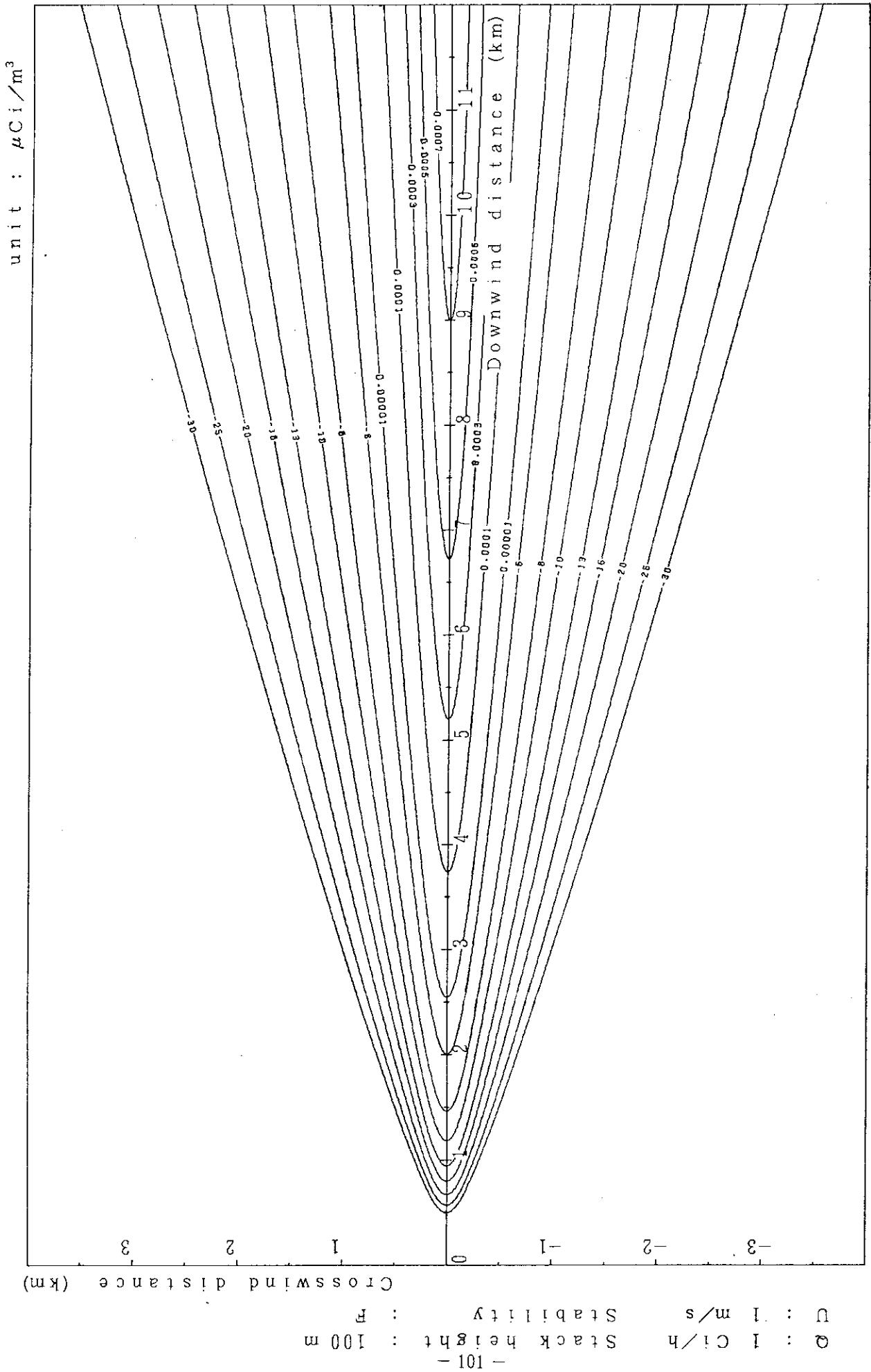


Fig. 2-7-6 (B) Isopleths of surface concentration

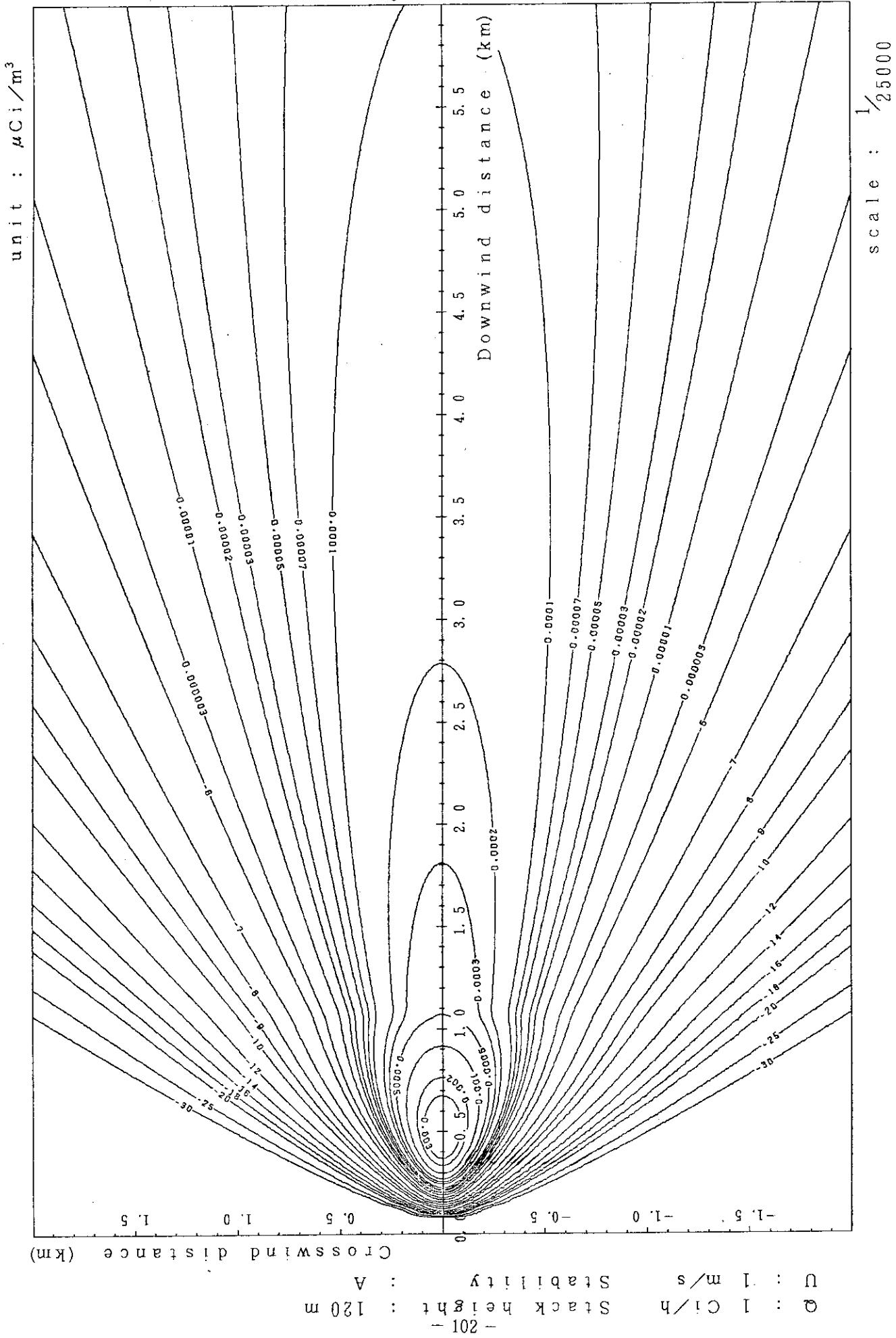


Fig. 2-8-1(A) Isopleths of surface concentration

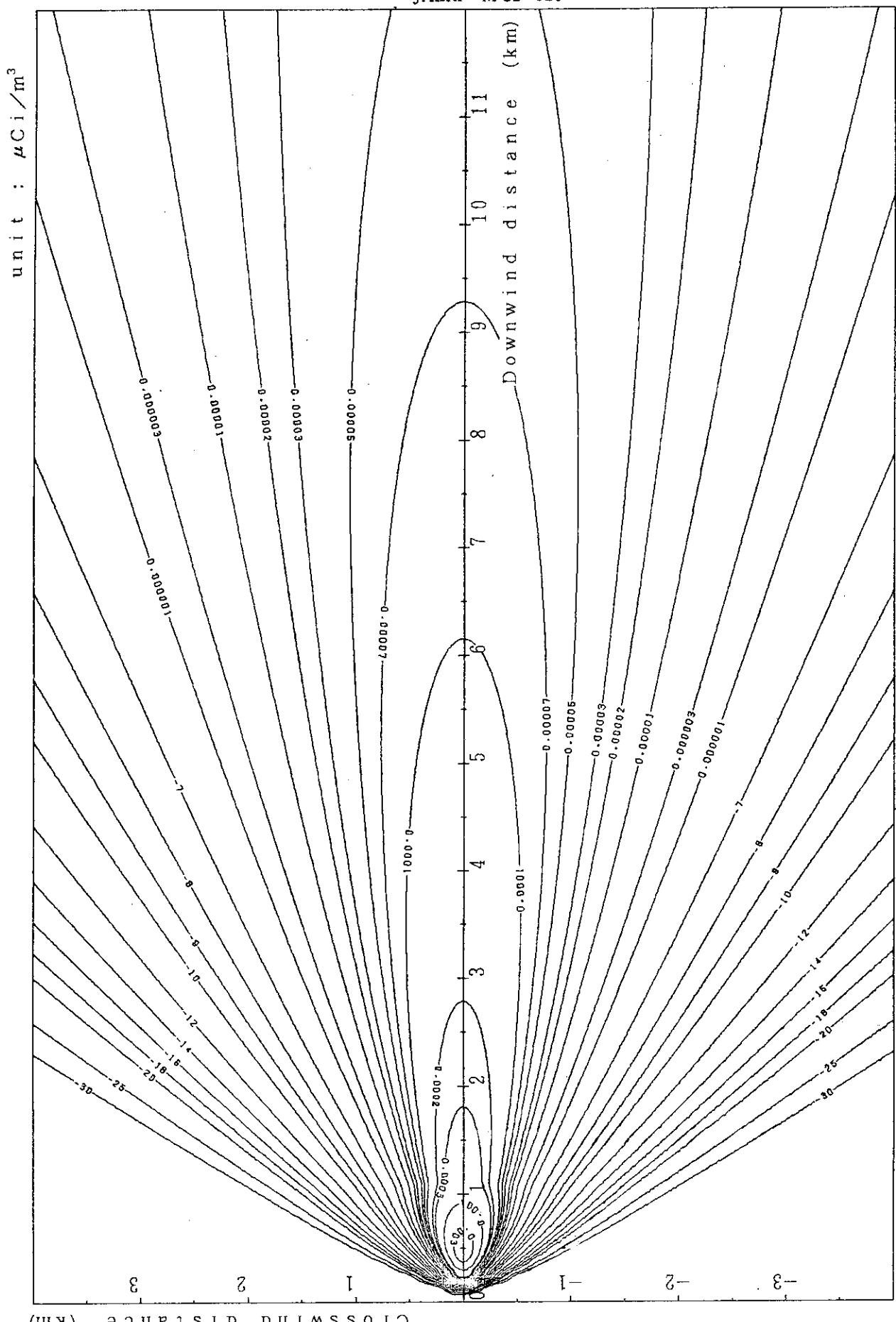


Fig. 2-8-1(B) Isopleths of surface concentration

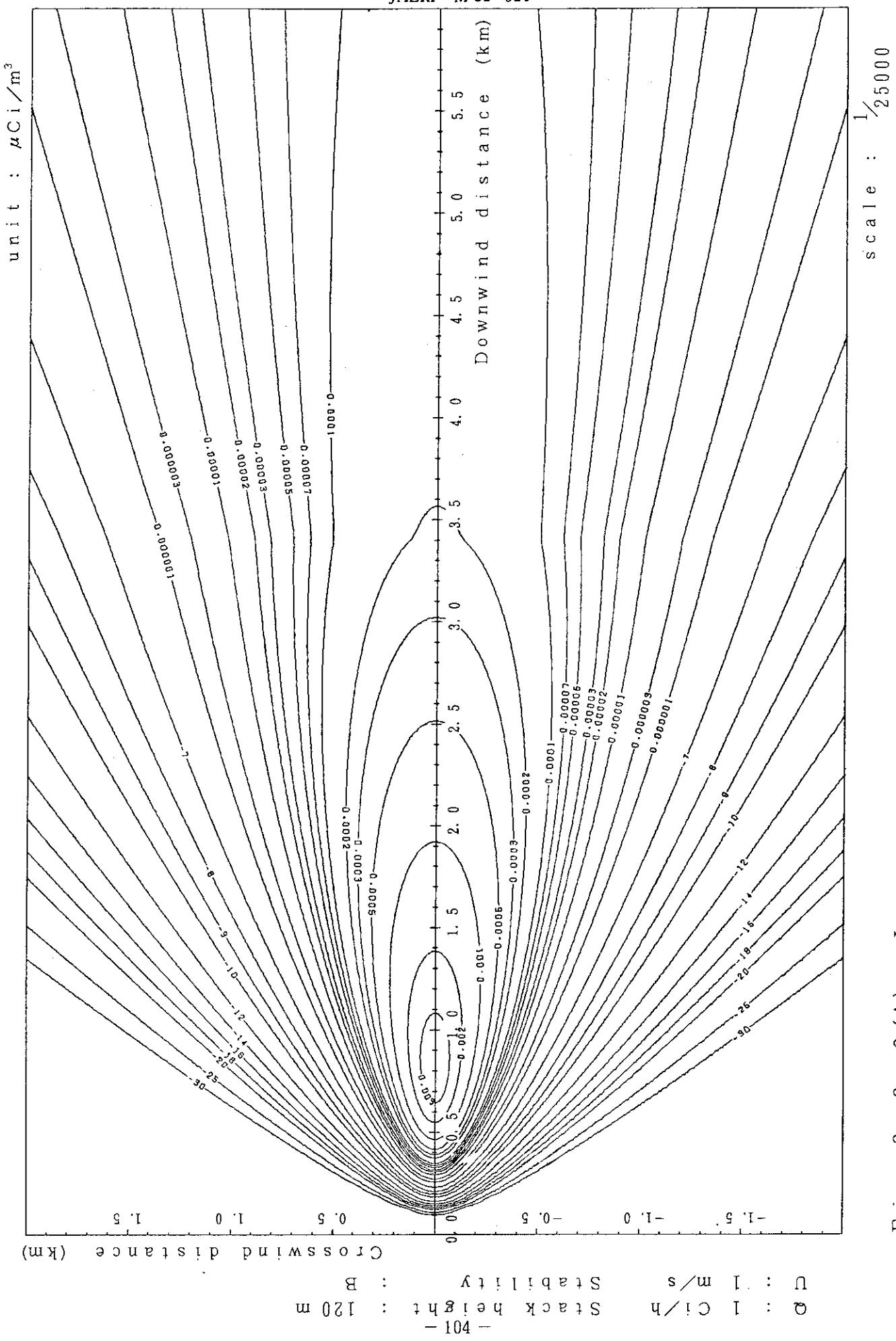


Fig. 2-8-2 (A) Isopleths of surface concentration

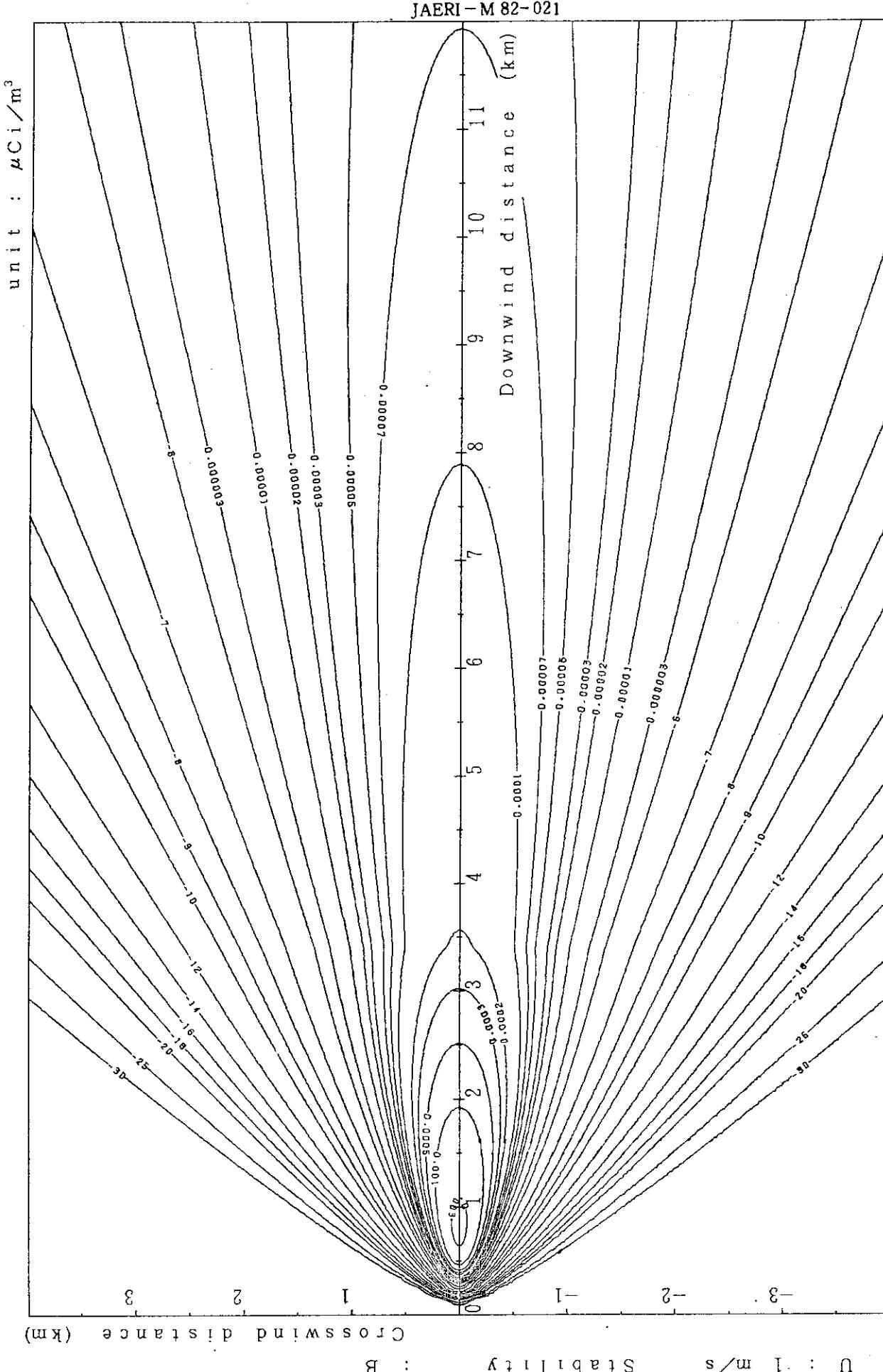


Fig. 2-8-2(B) Isopleths of surface concentration

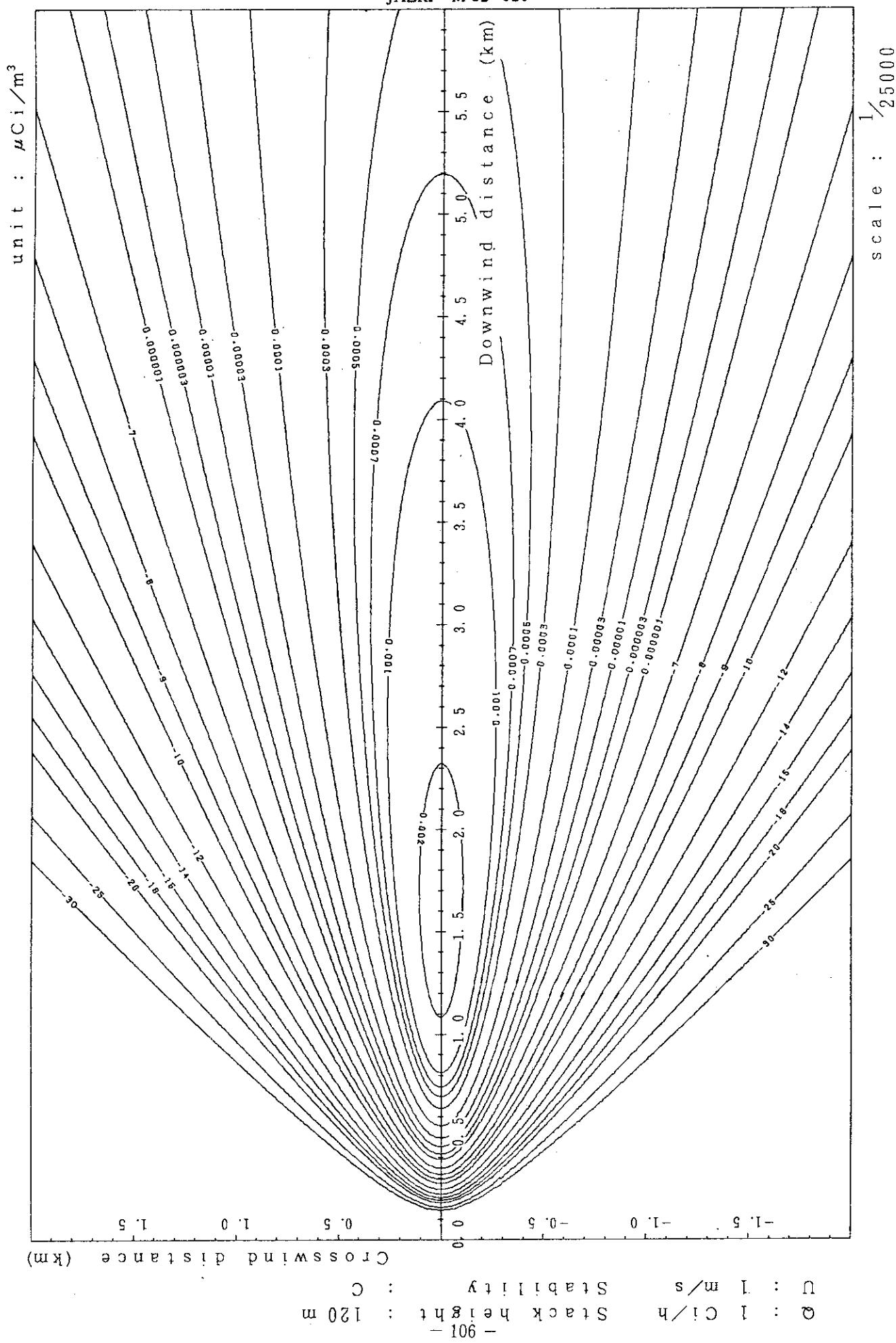


Fig. 2-8-3 (A) Isopleths of surface concentration

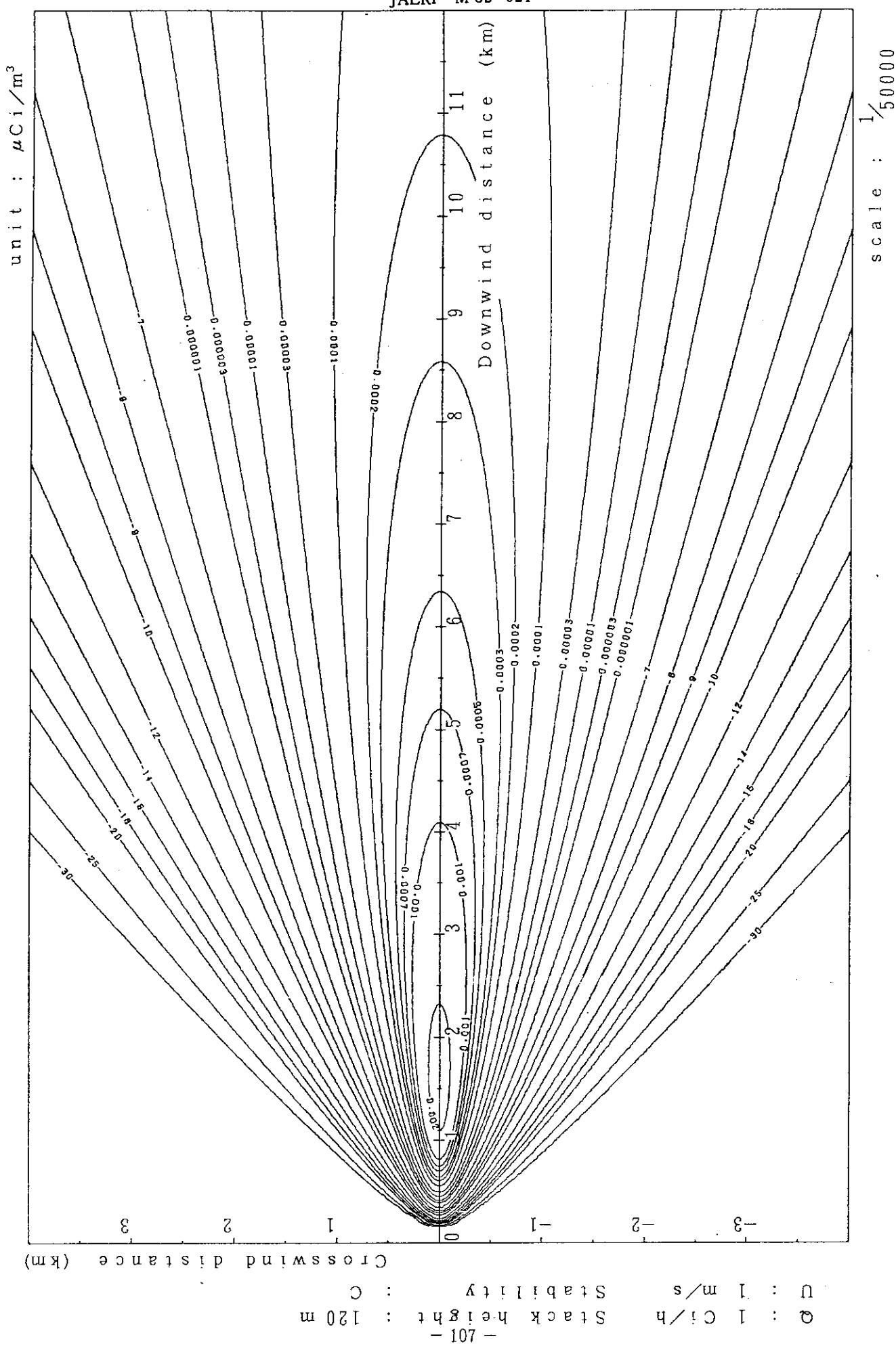


Fig. 2-8-3(B) Isopleths of surface concentration

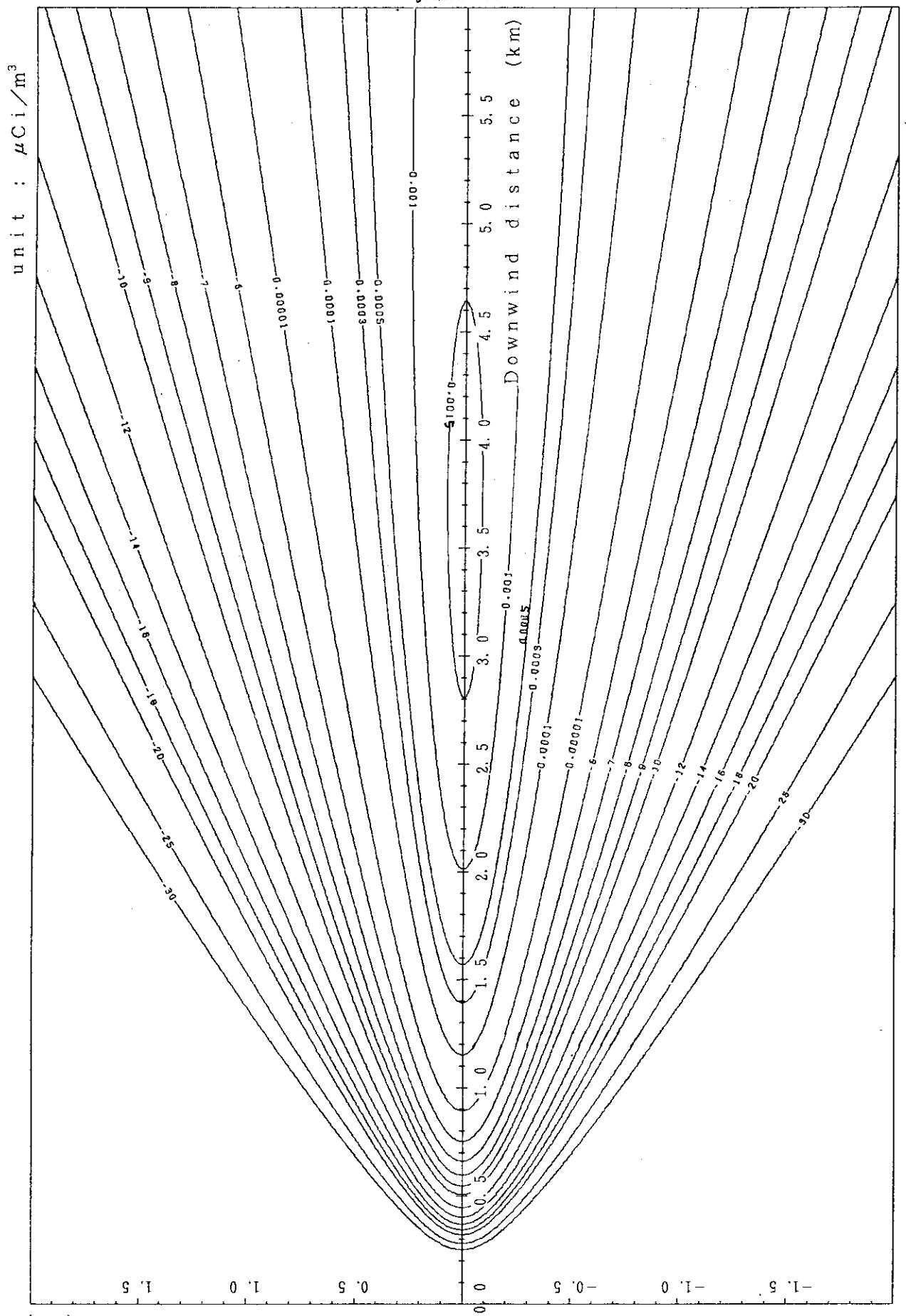
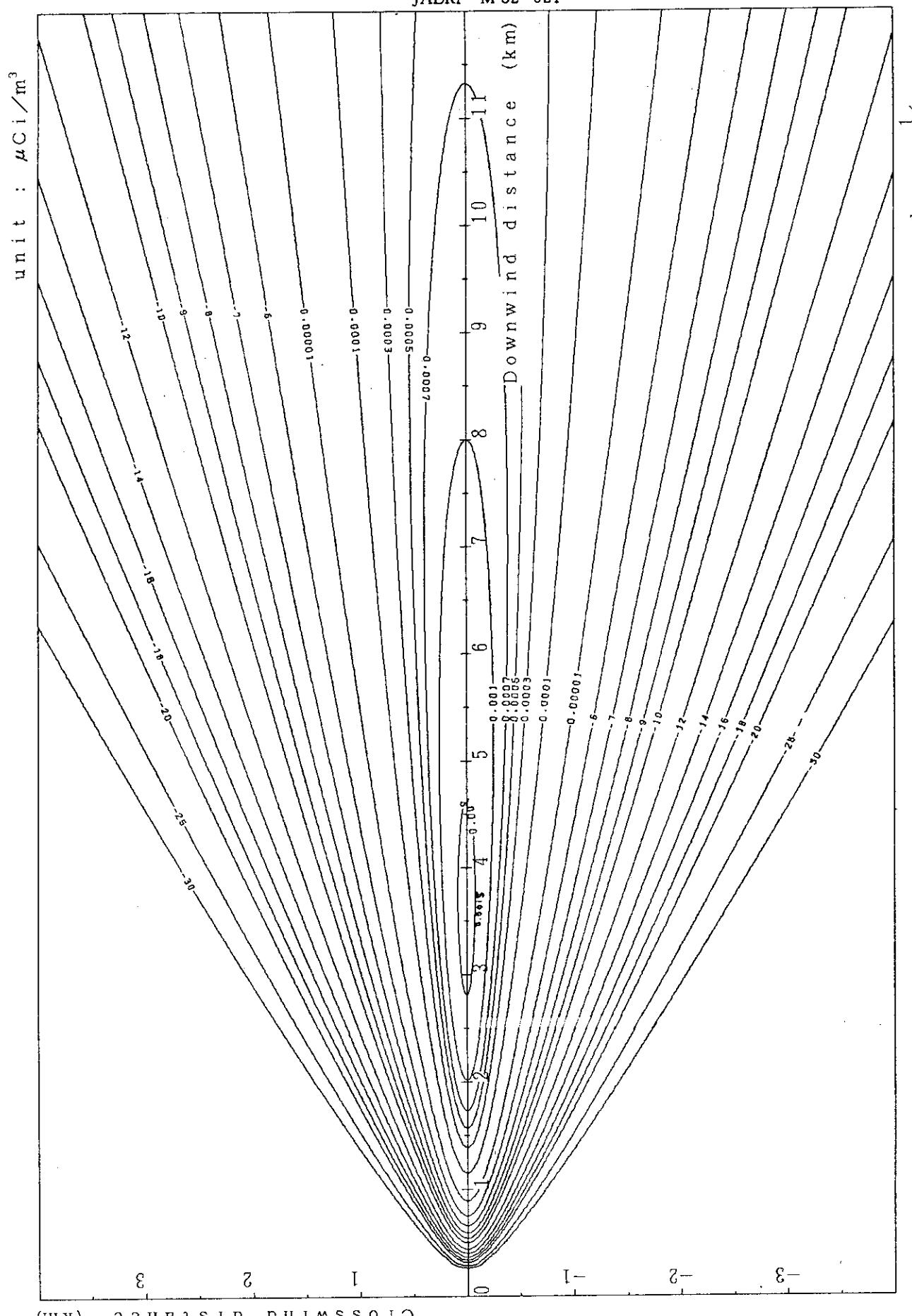


Fig. 2-8-4 (A) Isopleths of surface concentration

$Q : 1 \text{ Ci/h}$     $\text{Stack height} : 120 \text{ m}$     $U : 1 \text{ m/s}$     $\text{Stability} : D$

-80 -



$Q : 1 \text{ Ci/h}$  Stack height : 120 m  
 $U : 1 \text{ m/s}$  Stability : D  
- 69 -

Fig. 2-8-4 (B) Isopleths of surface concentration  
scale :  $1/50000$

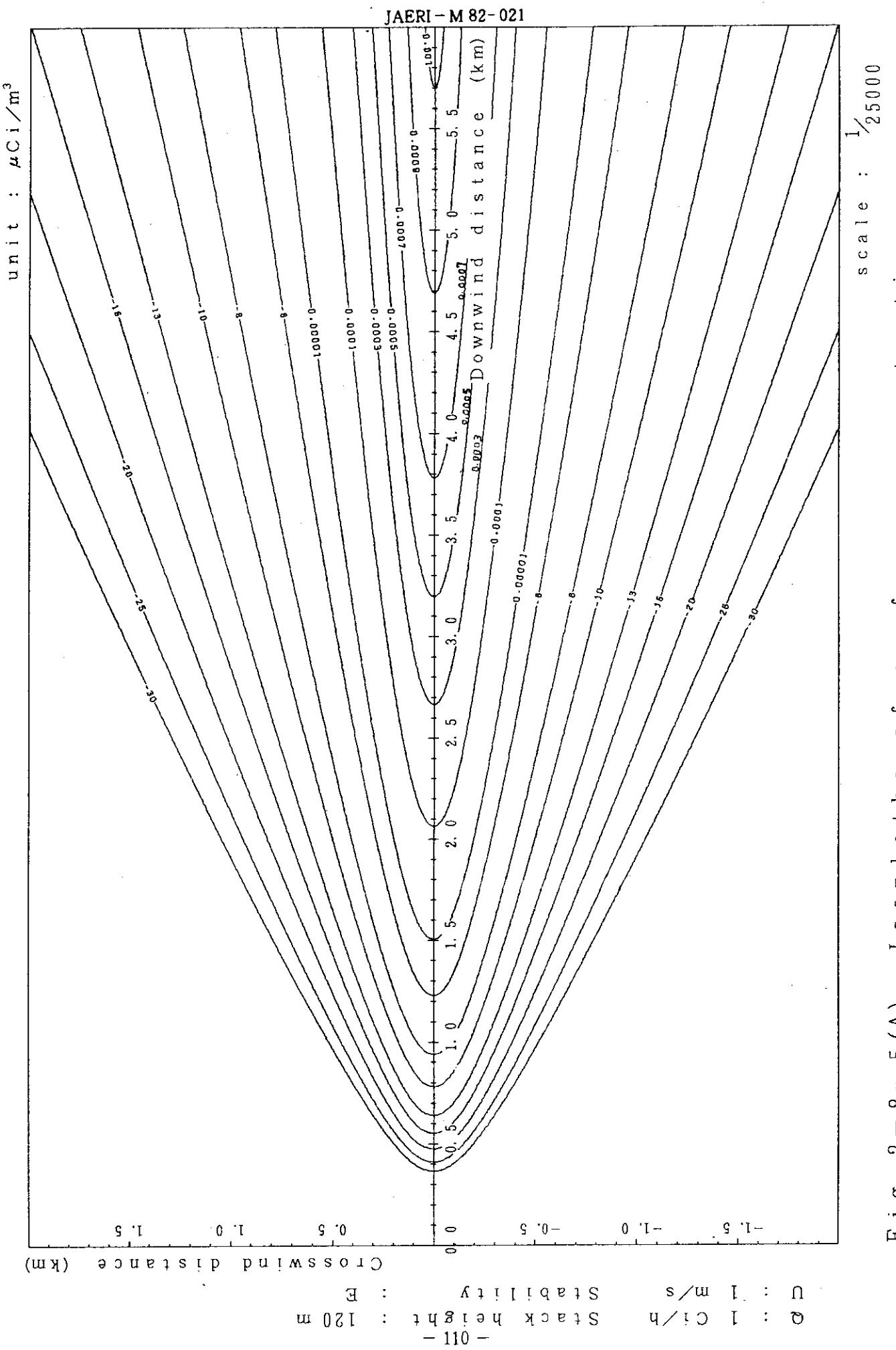


Fig. 2-8-5 (A) Isopleths of surface concentration

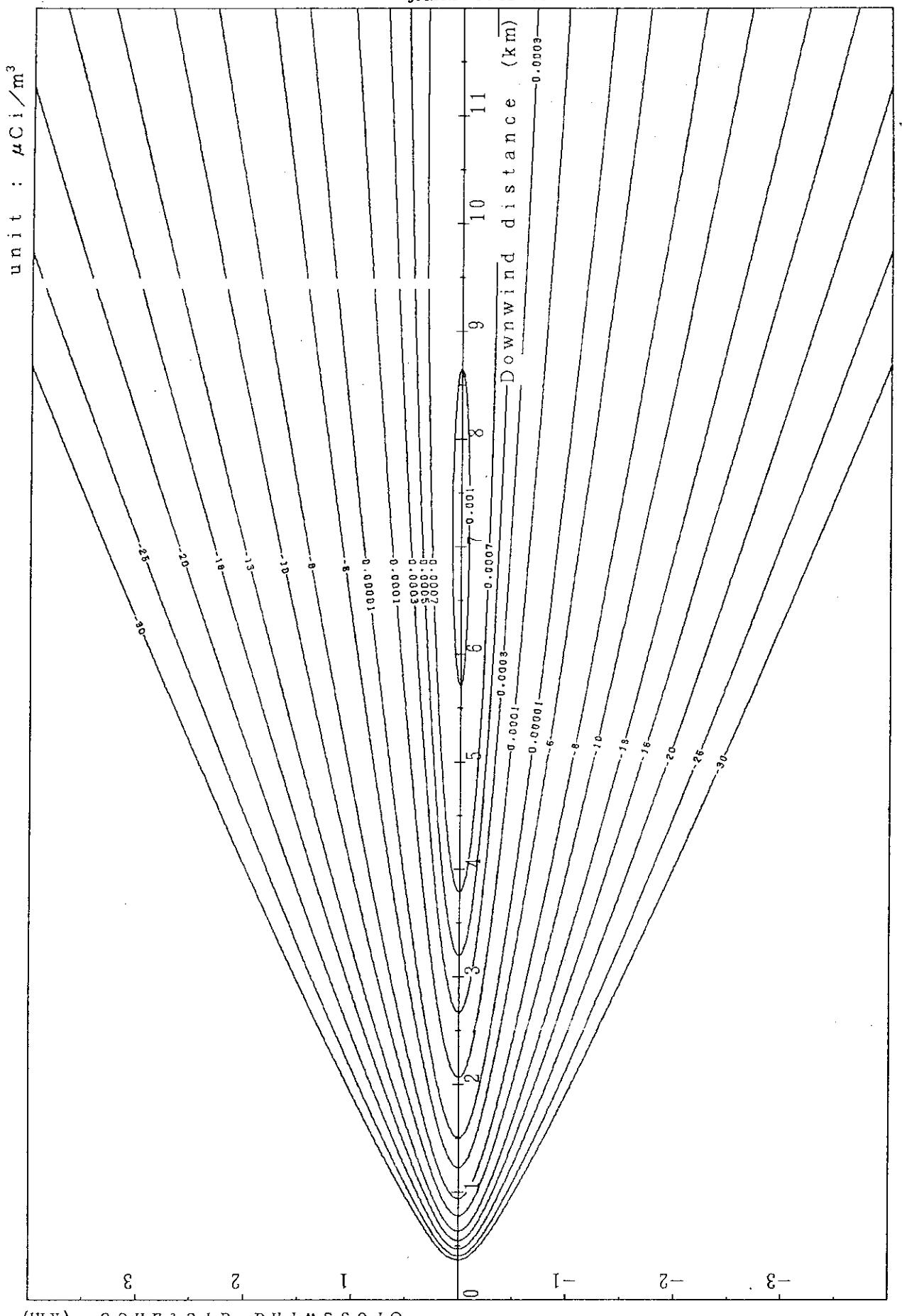


Fig. 2-8-5 (B) Isopleths of surface concentration  
scale :  $1/50000$

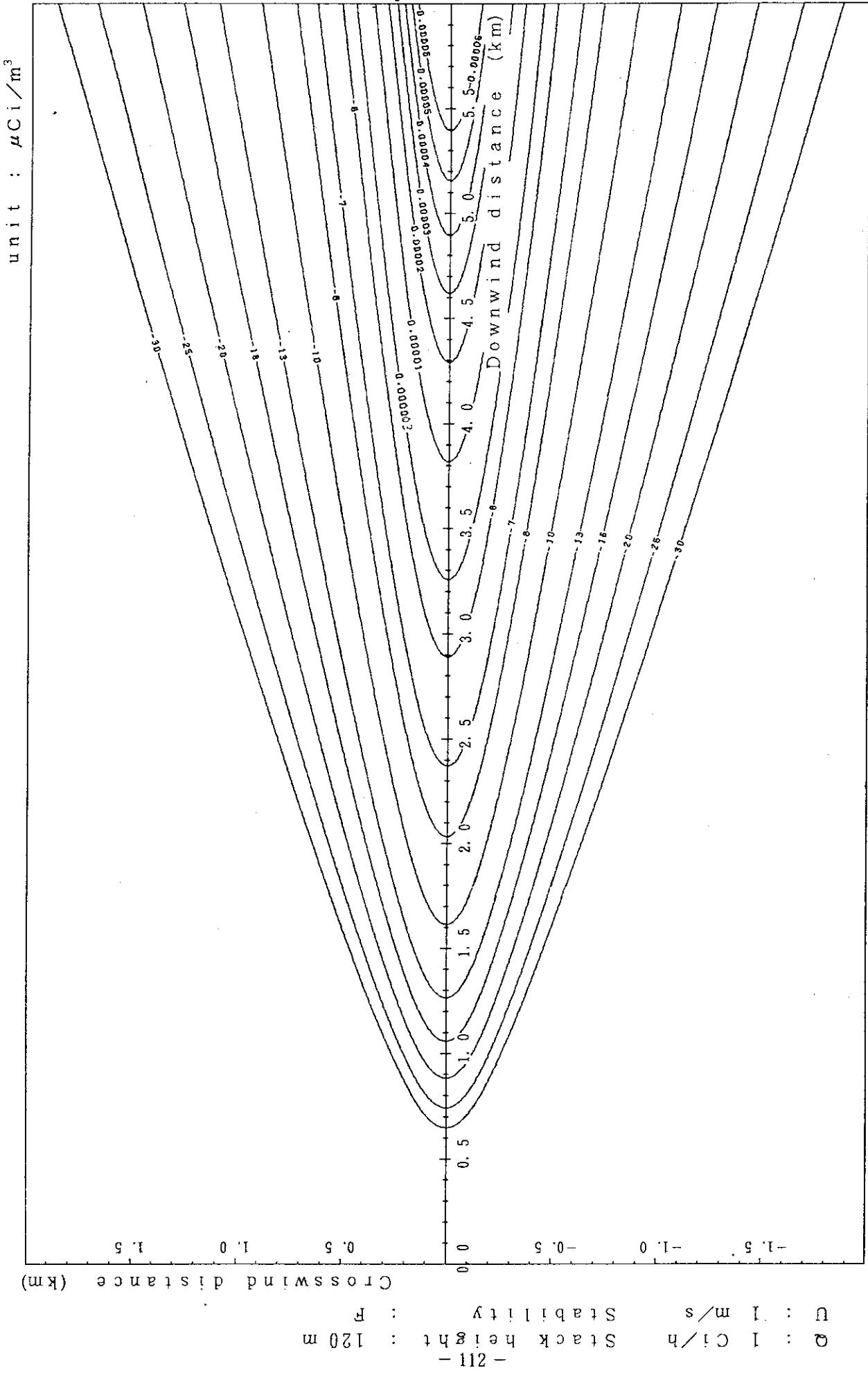


Fig. 2-8-6(A) Isopleths of surface concentration  
scale :  $1/25000$

JAERI - M 82- 021

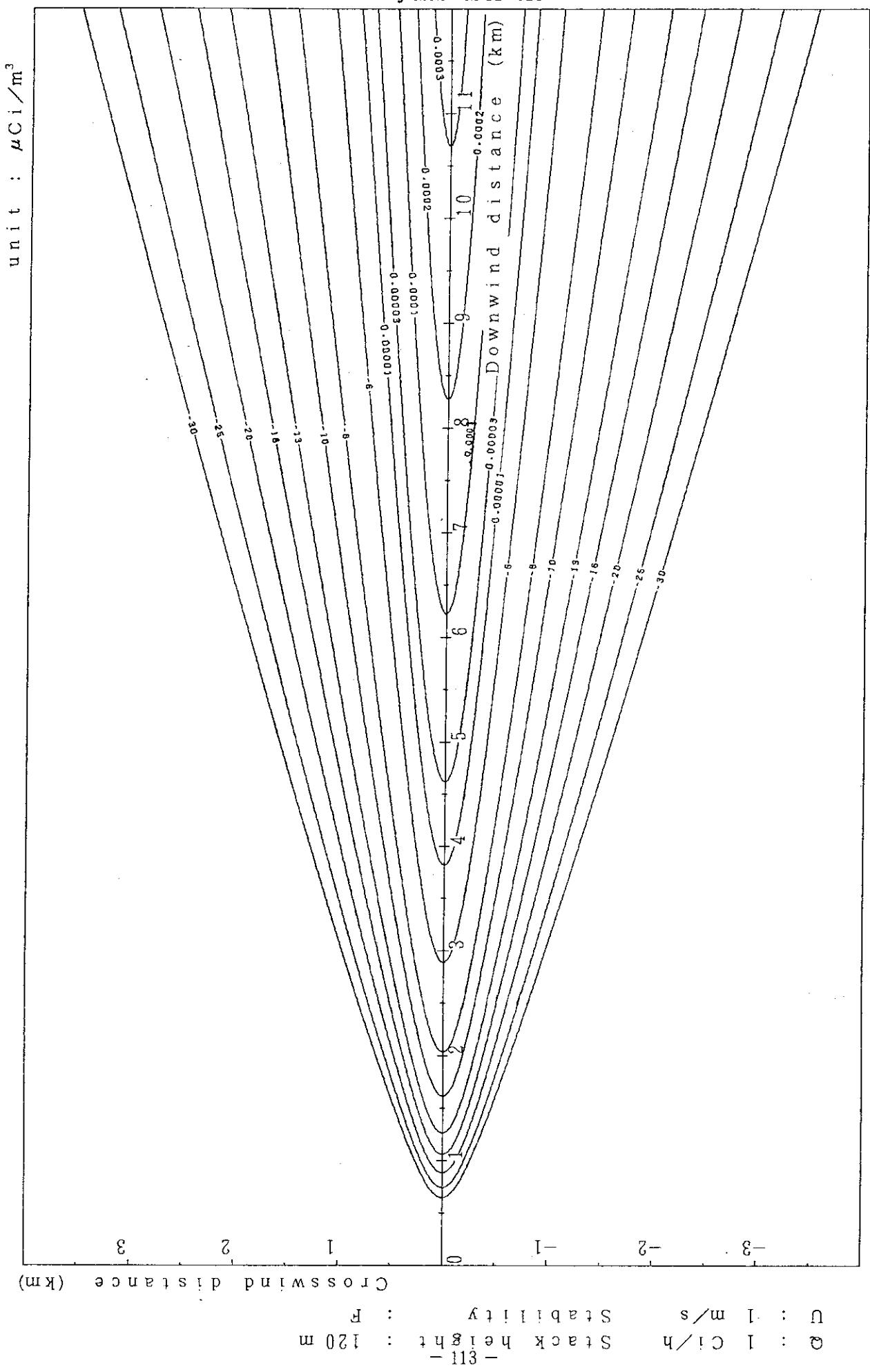


Fig. 2-8-6 (B) Isopleths of surface concentration

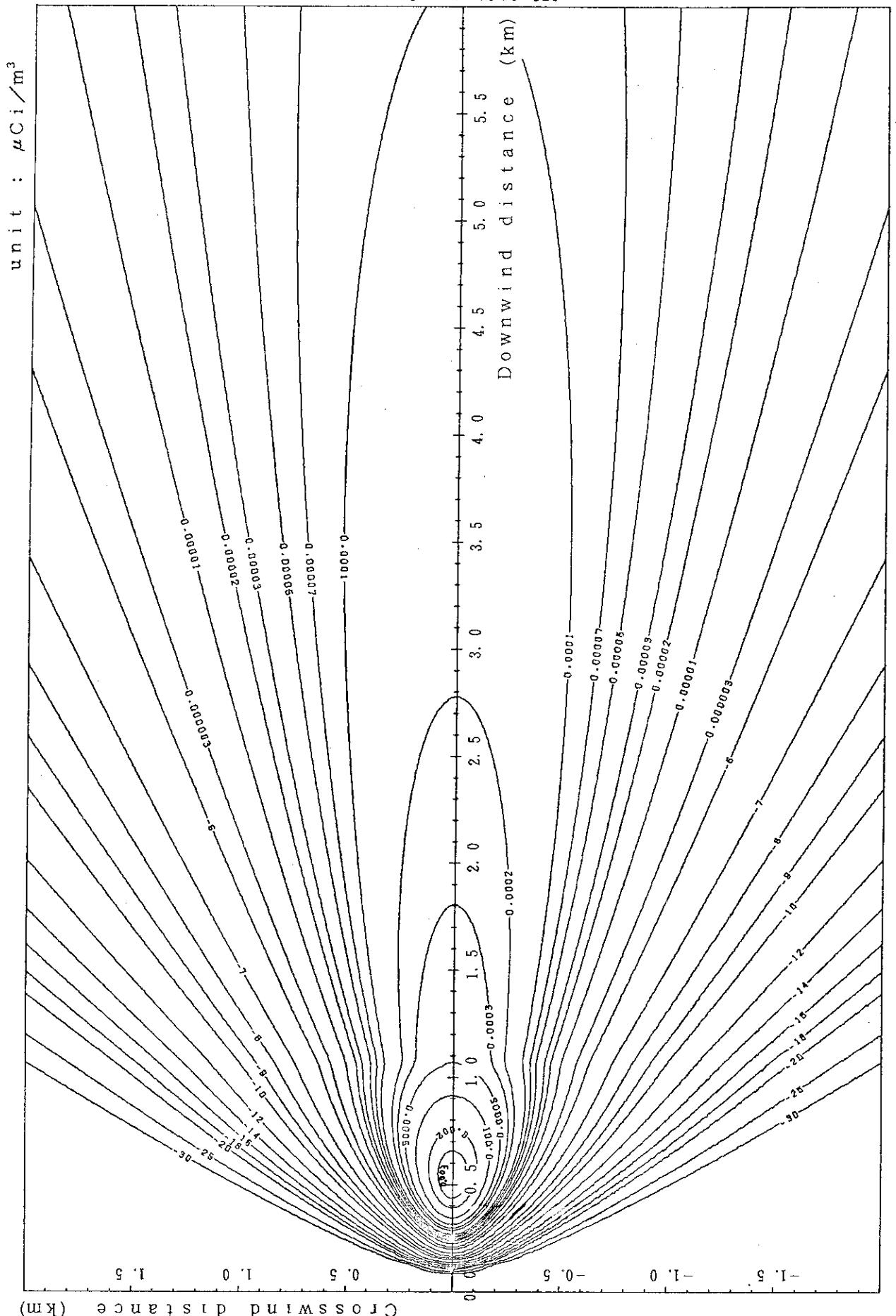


Fig. 2-9-1(A) Isopleths of surface concentration

scale :  $1/25000$

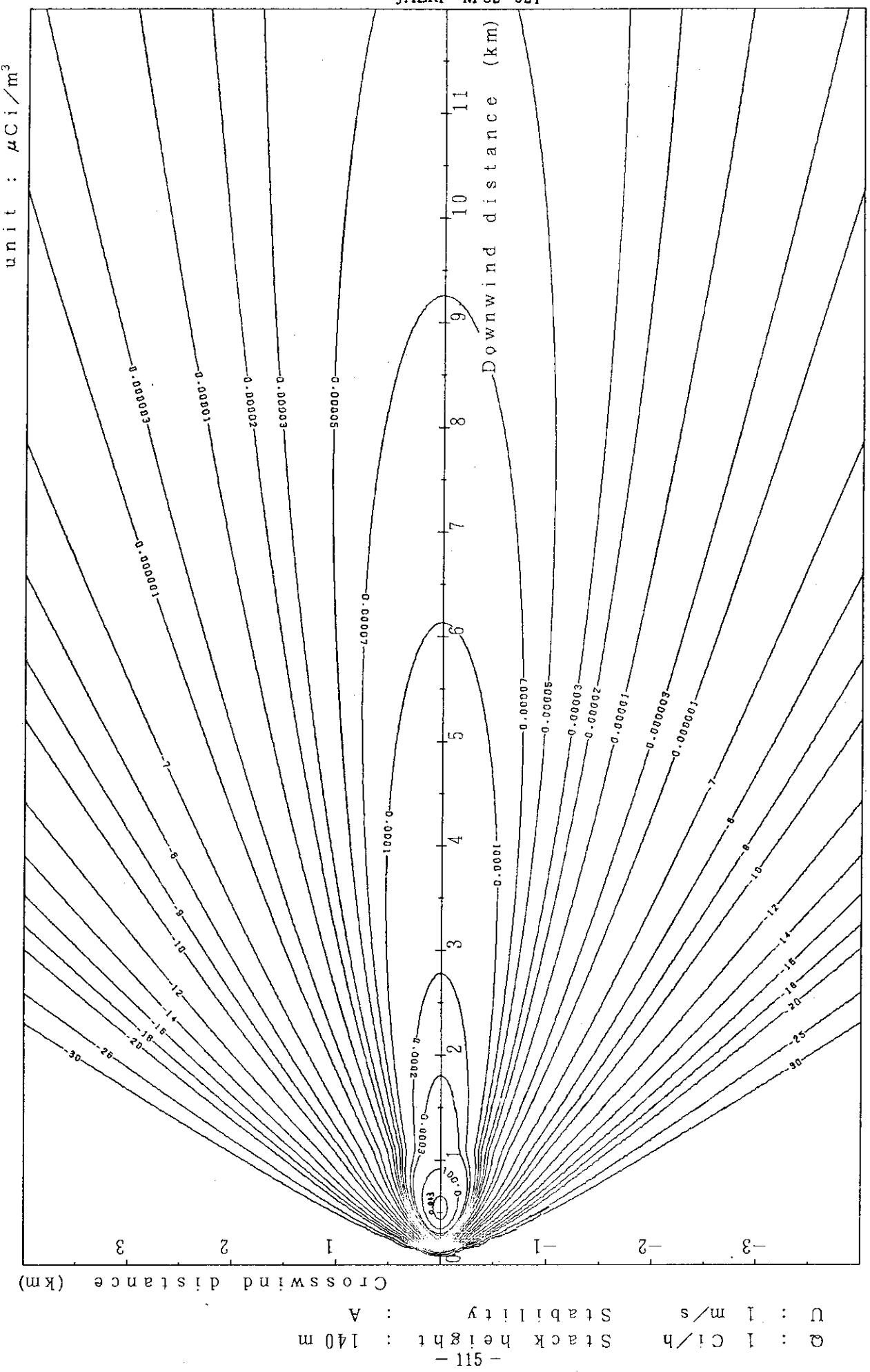


Fig. 2-9-1(B) Isopleths of surface concentration

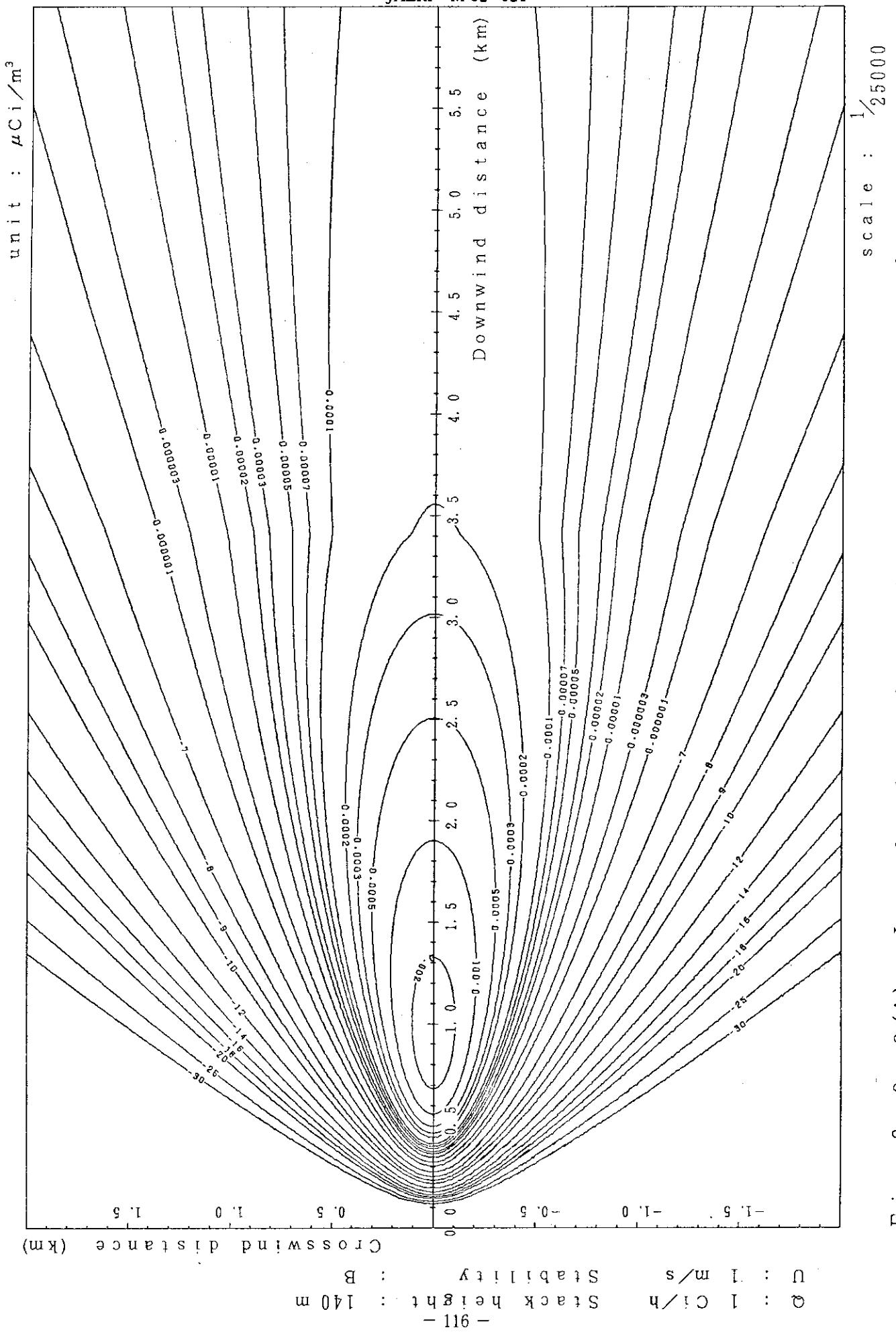


Fig. 2-9-2 (A) Isopleths of surface concentration

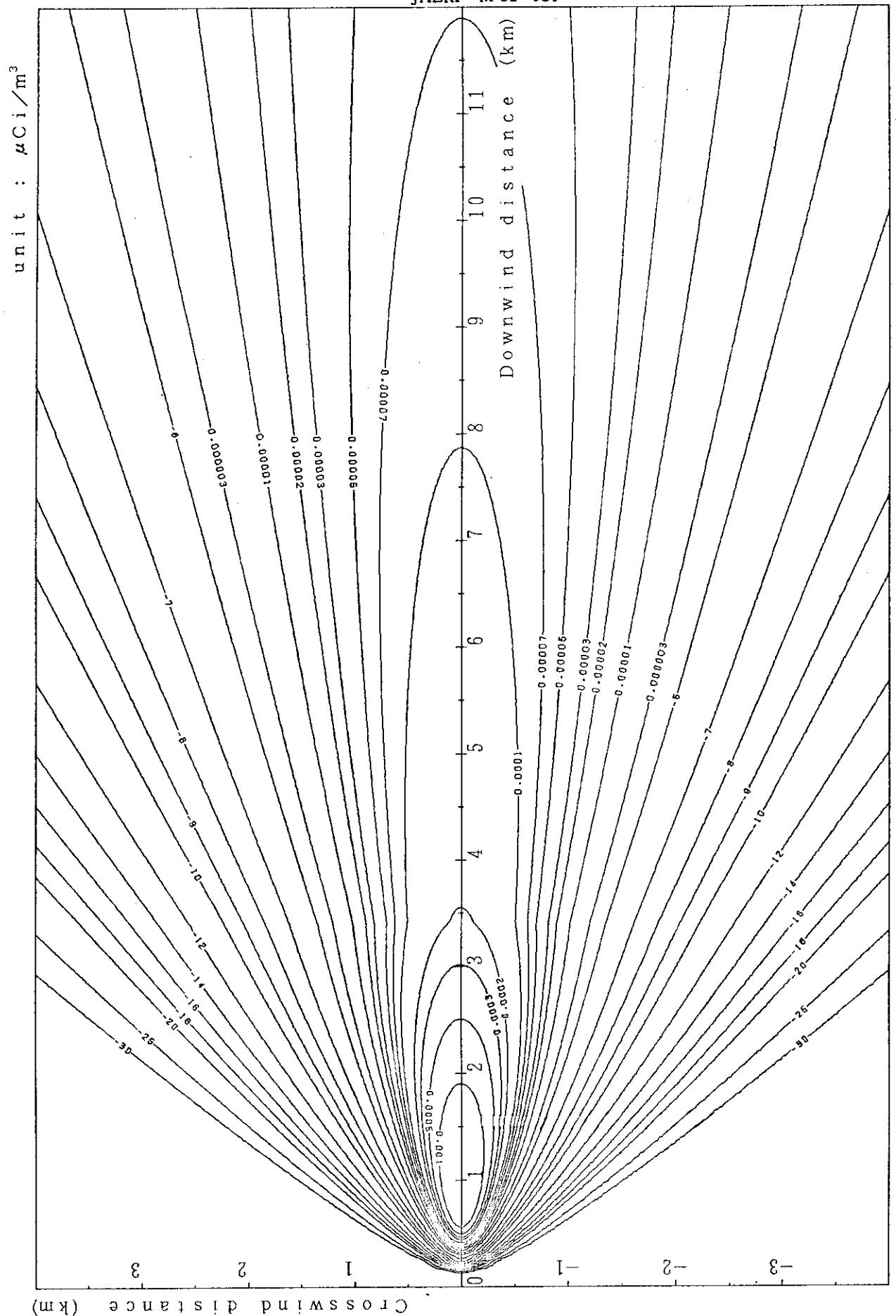


Fig. 2-9-2 (B) Isopleths of surface concentration  
scale :  $1/50000$

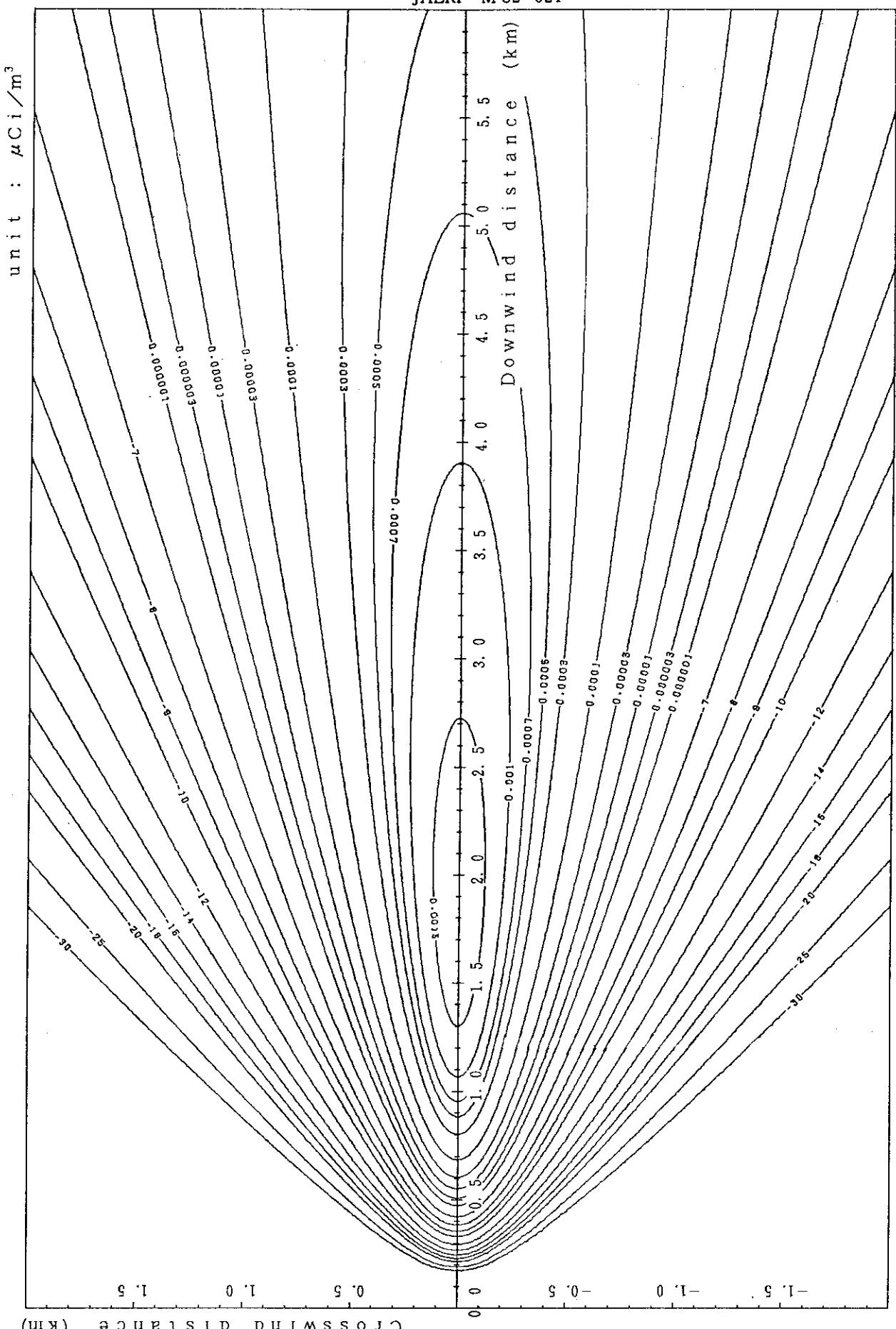


Fig. 2-9-3 (A) Isopleths of surface concentration

$Q$  : 1  $\text{Ci}/\text{h}$  Stack height : 140 m  
 $U$  : 1  $\text{m}/\text{s}$  Stability : C

-811-

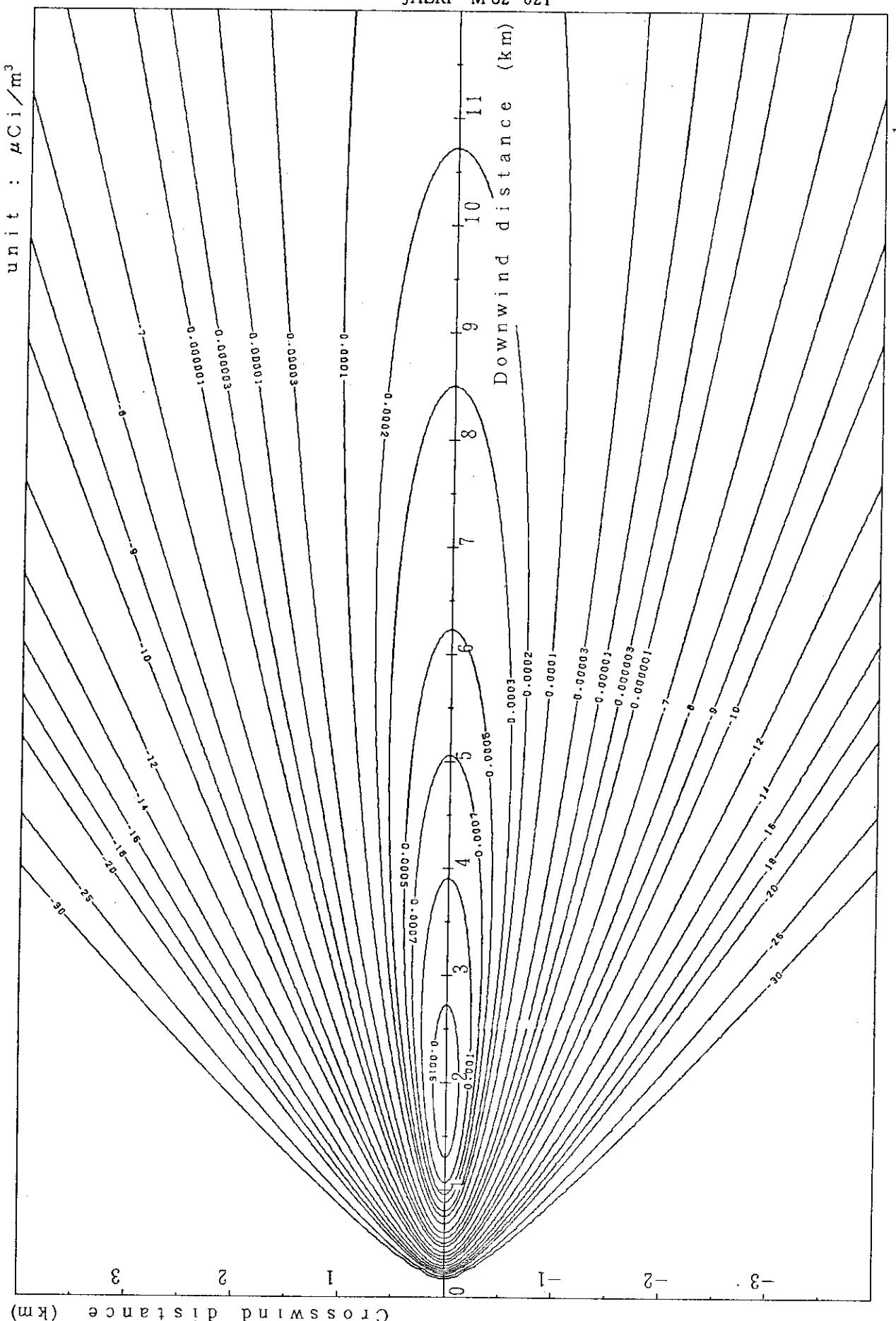


Fig. 2-9-3 (B) Isopleths of surface concentration

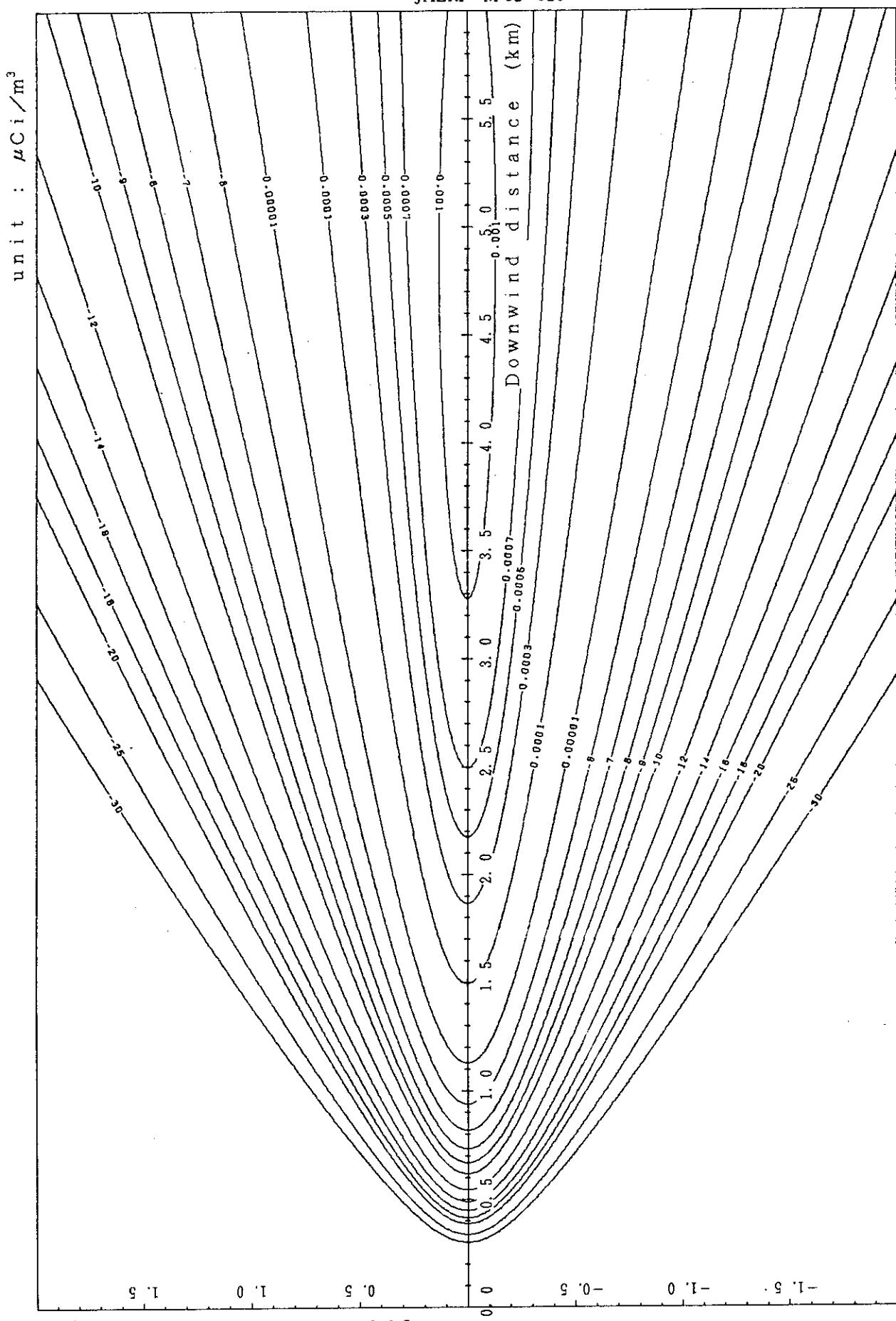


Fig. 2-9-4 (A) Isopleths of surface concentration

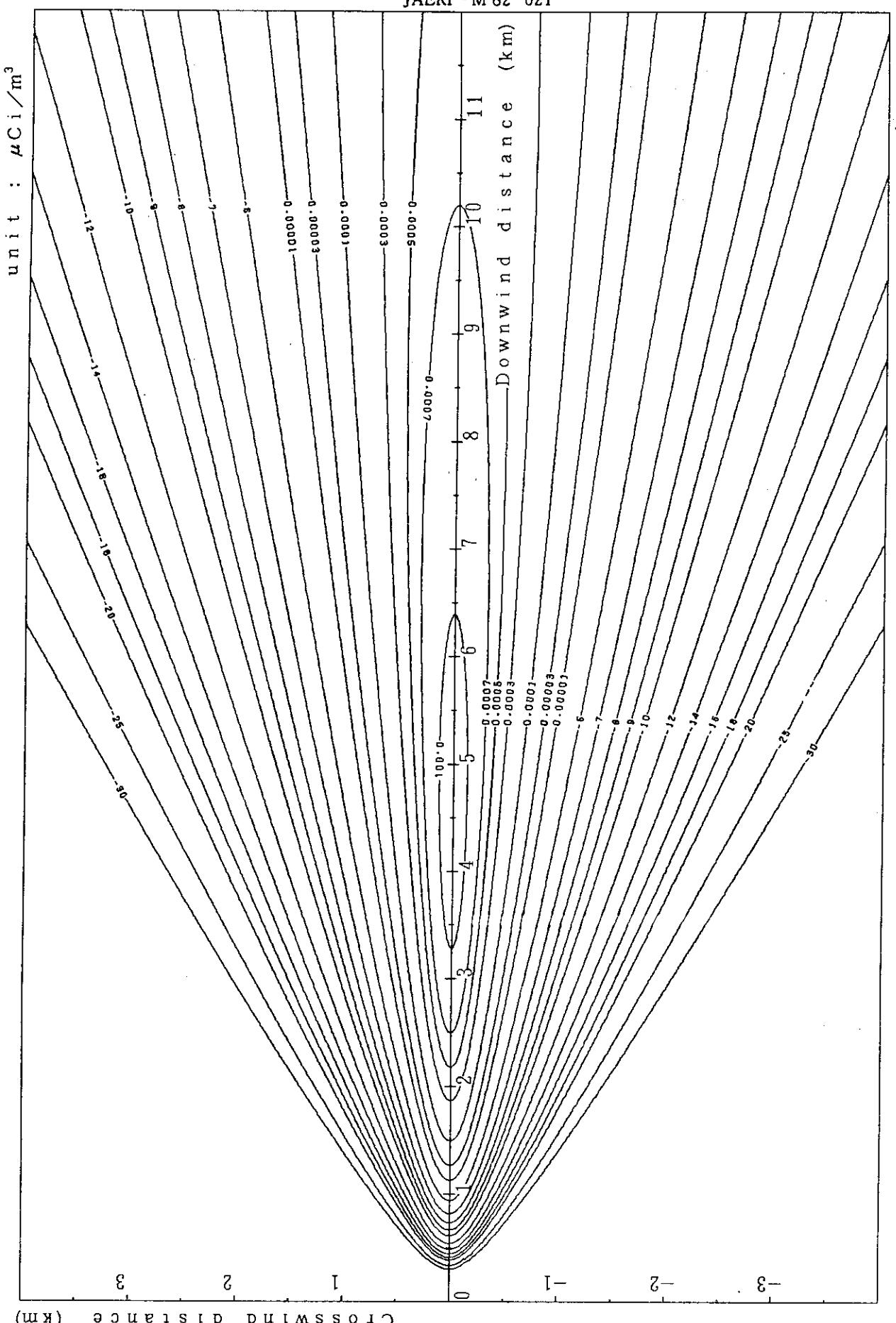


Fig. 2-9-4 (B) Isopleths of surface concentration

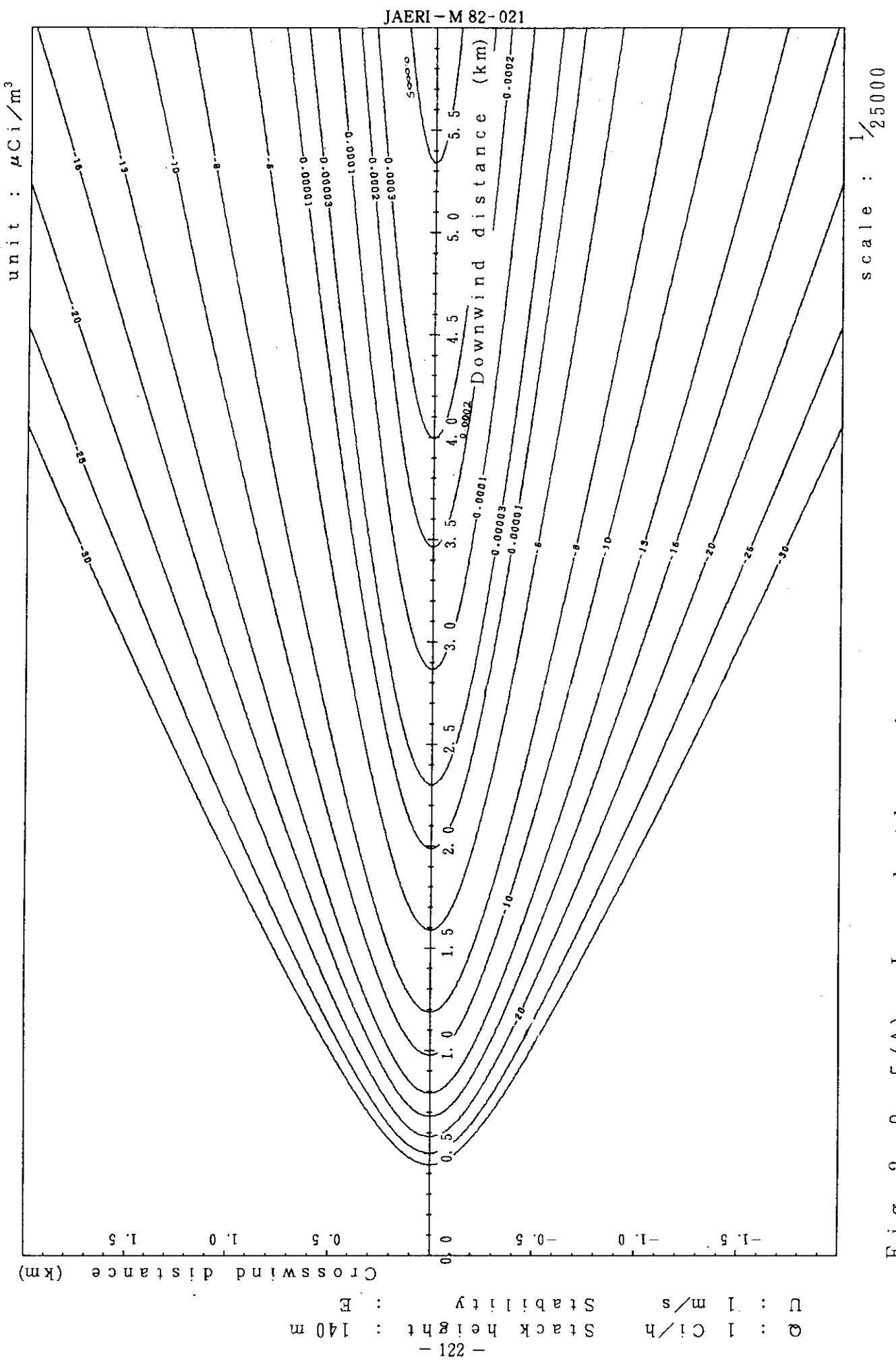


Fig. 2-9-5 (A) Isopleths of surface concentration

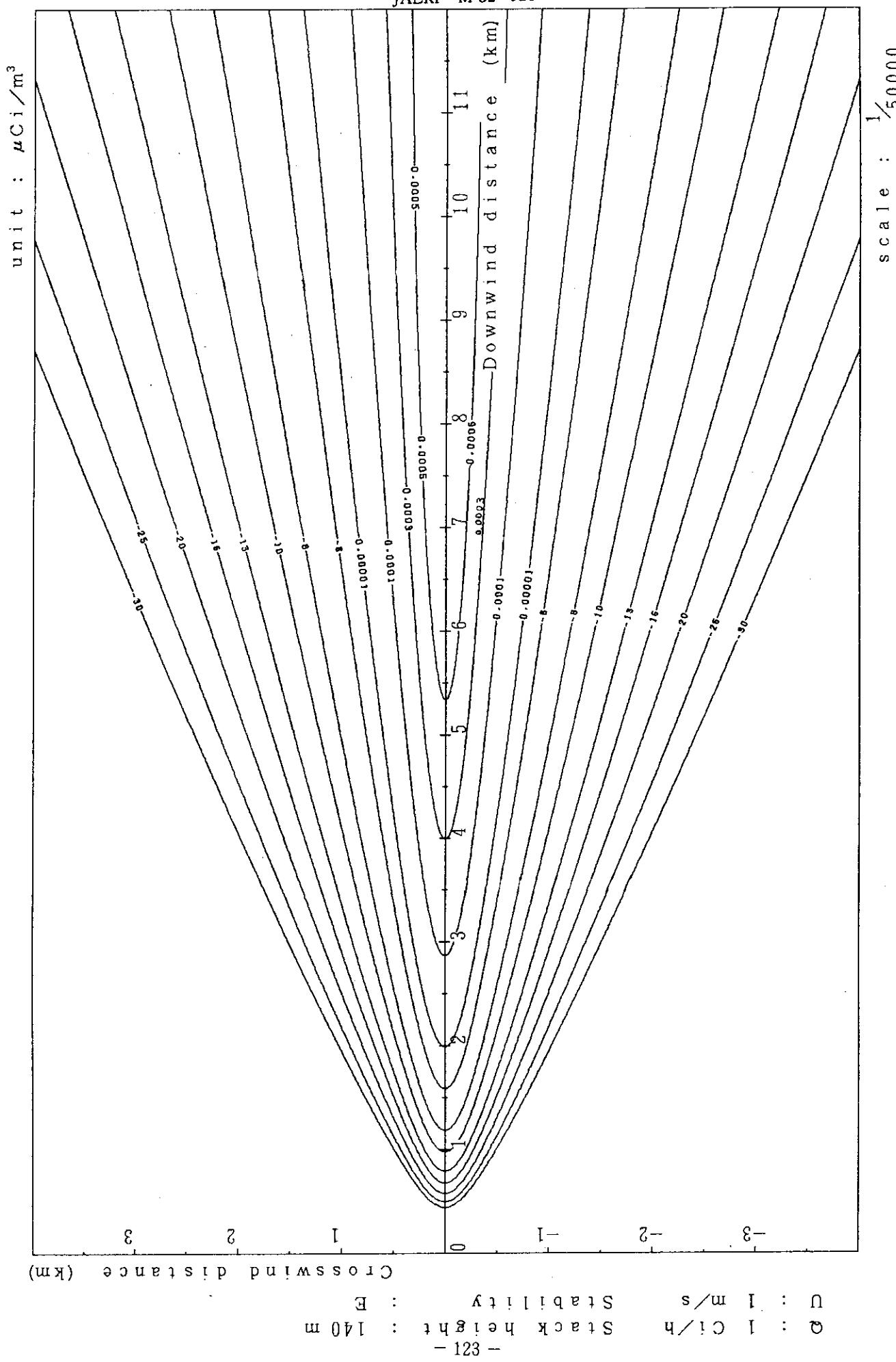


Fig. 2-9-5(B) Isopleths of surface concentration scale :  $1/50000$

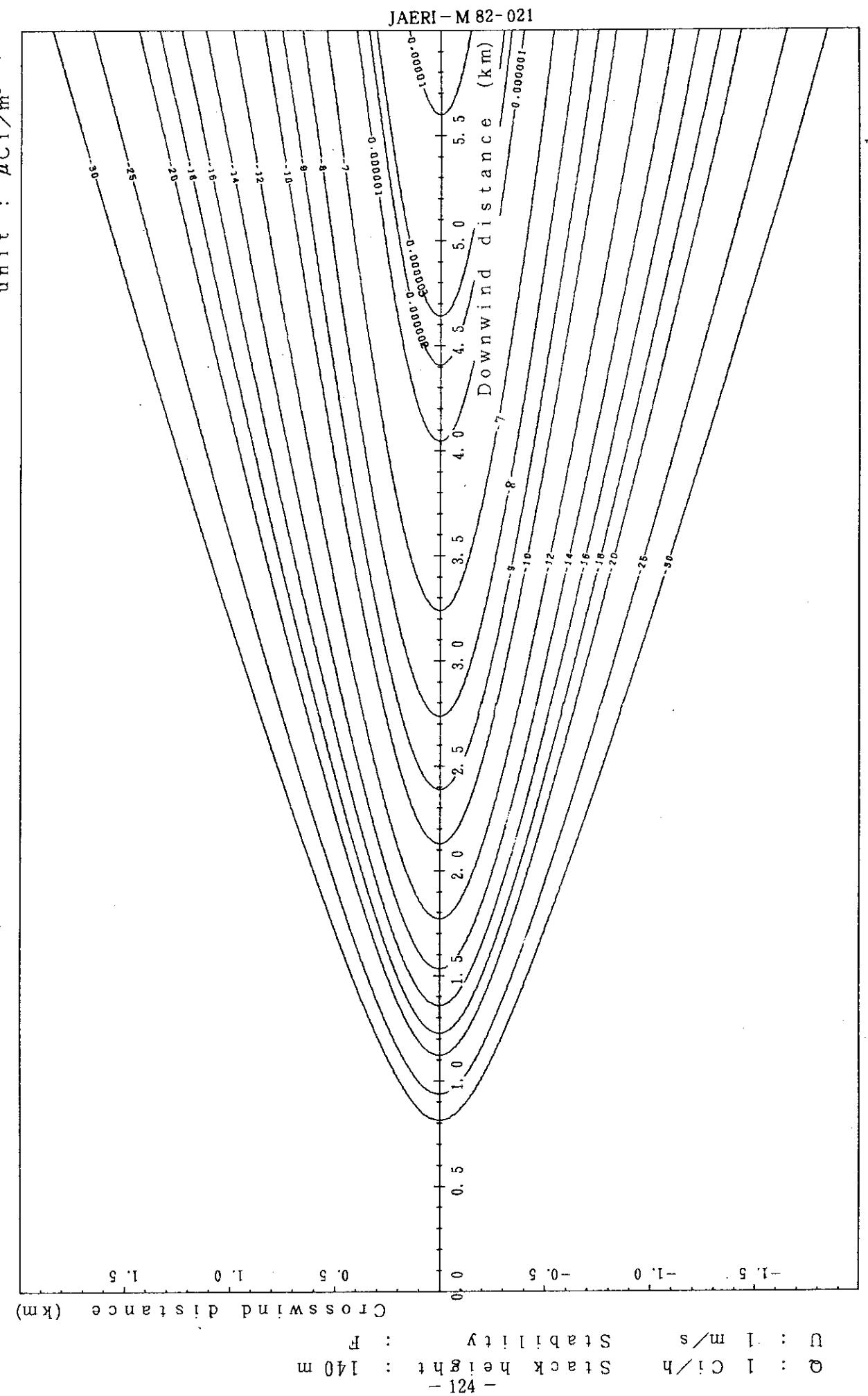


Fig. 2-9-6 (A) Isopleths of surface concentration

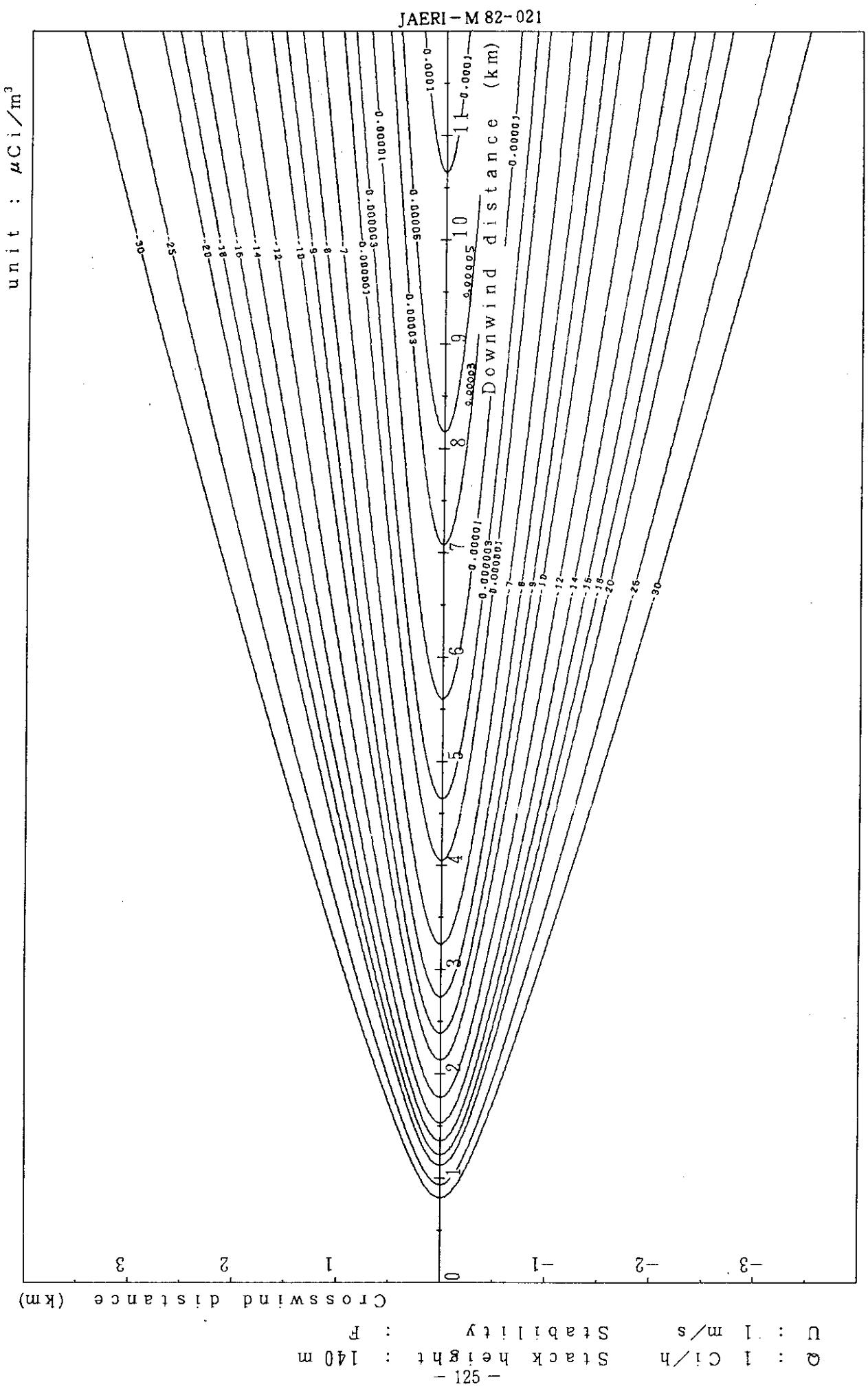


Fig. 2-9-6 (B) Isopleths of surface concentration

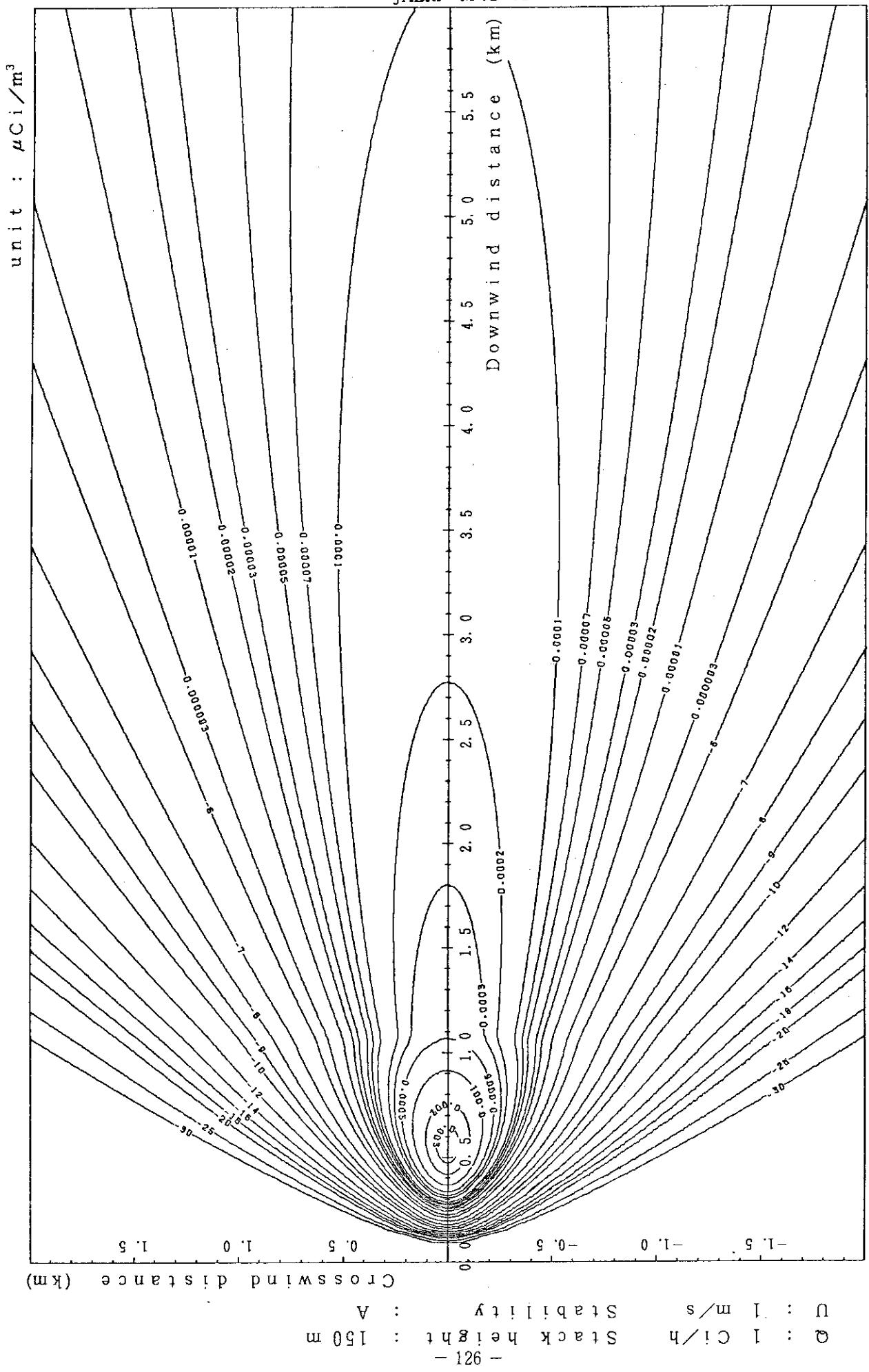


Fig. 2-10-1 (A) Isopleths of surface concentration  
scale :  $1/25000$

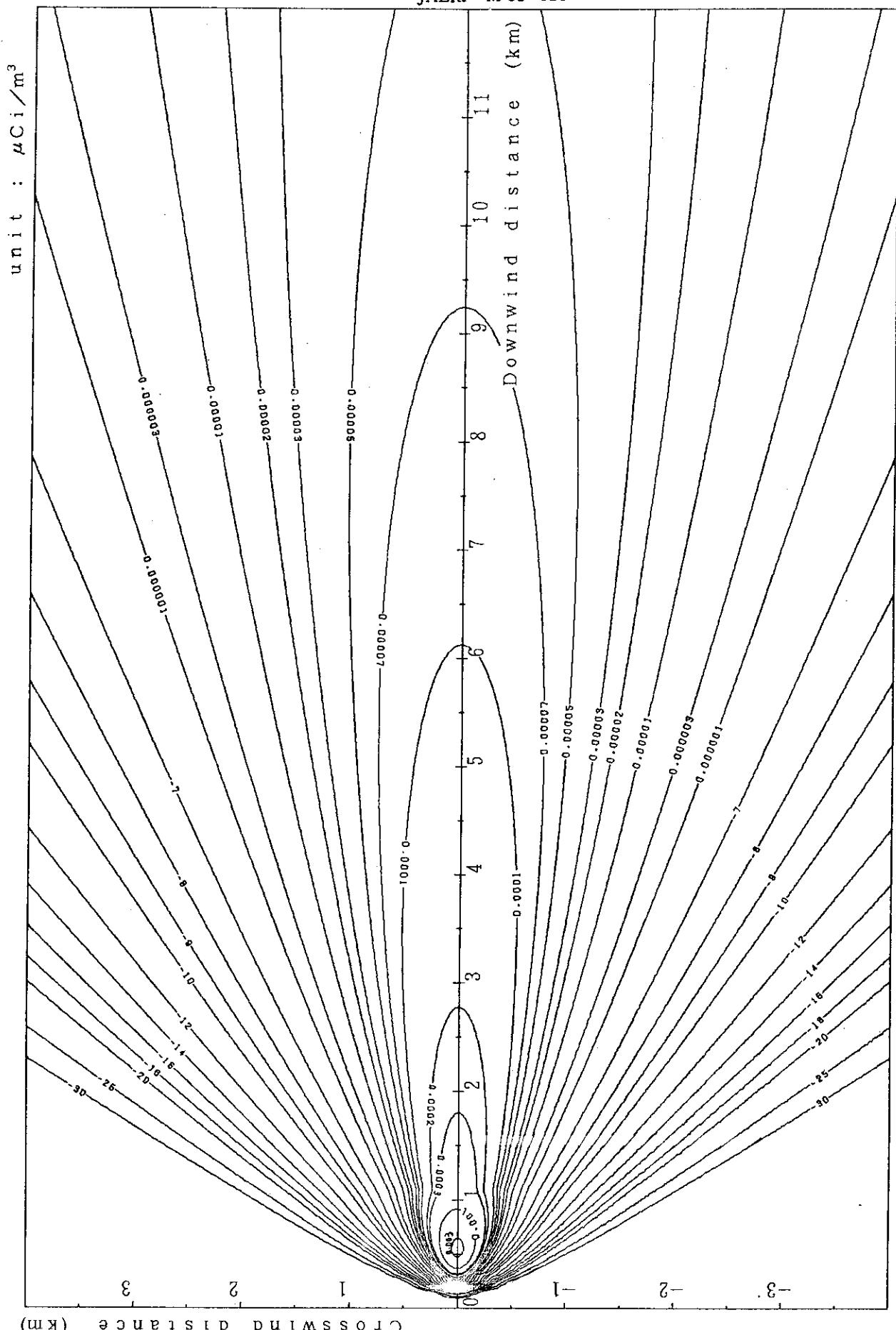


Fig. 2-10-1 (B) Isopleths of surface concentration

$U : 1 \text{ m/s}$     $S t a b i l i t y : A$   
 $\alpha : 1 \text{ Ci/h}$     $S t a c k \text{ height} : 150 \text{ m}$

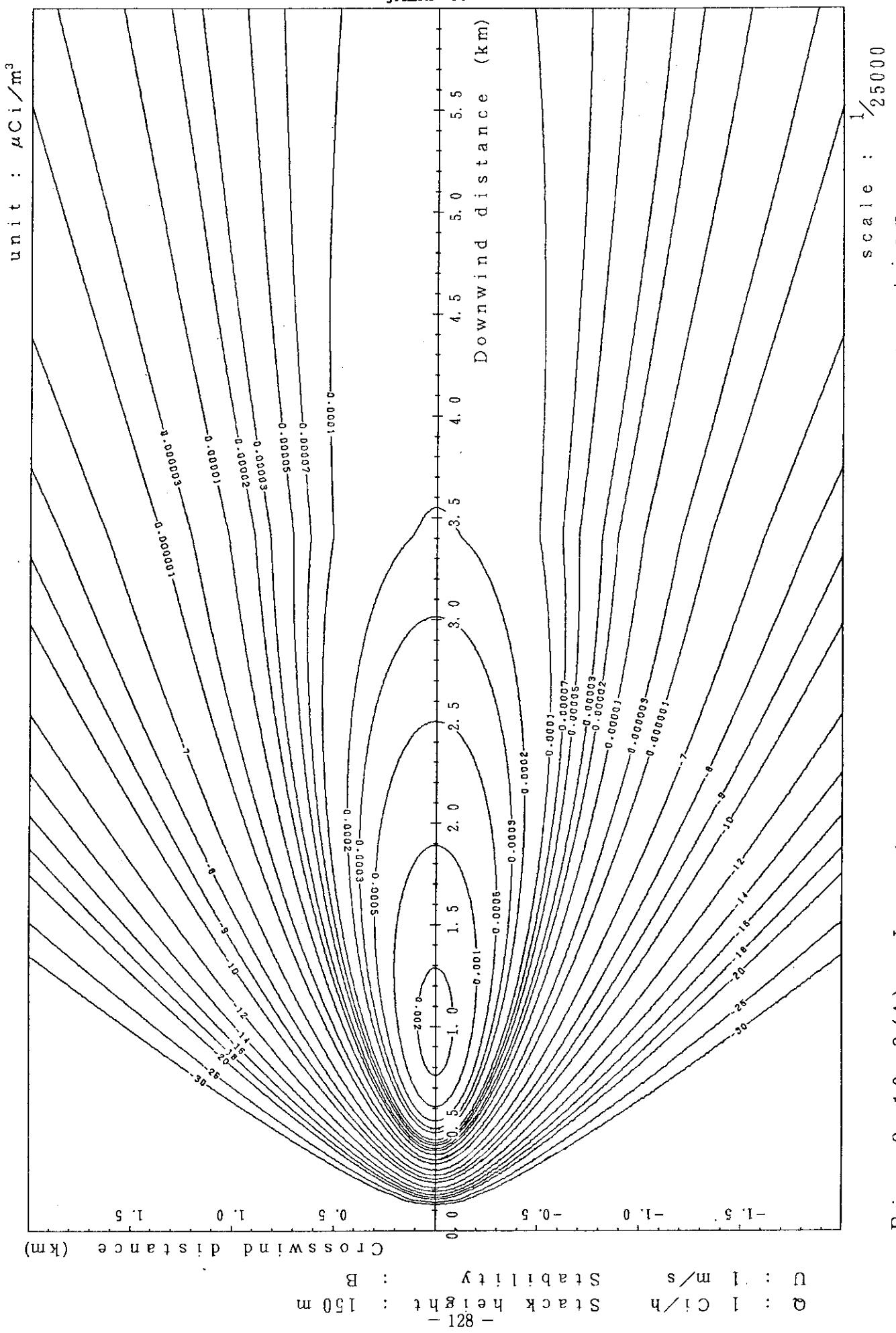


Fig. 2-10-2 (A)

Isopleths of surface concentration

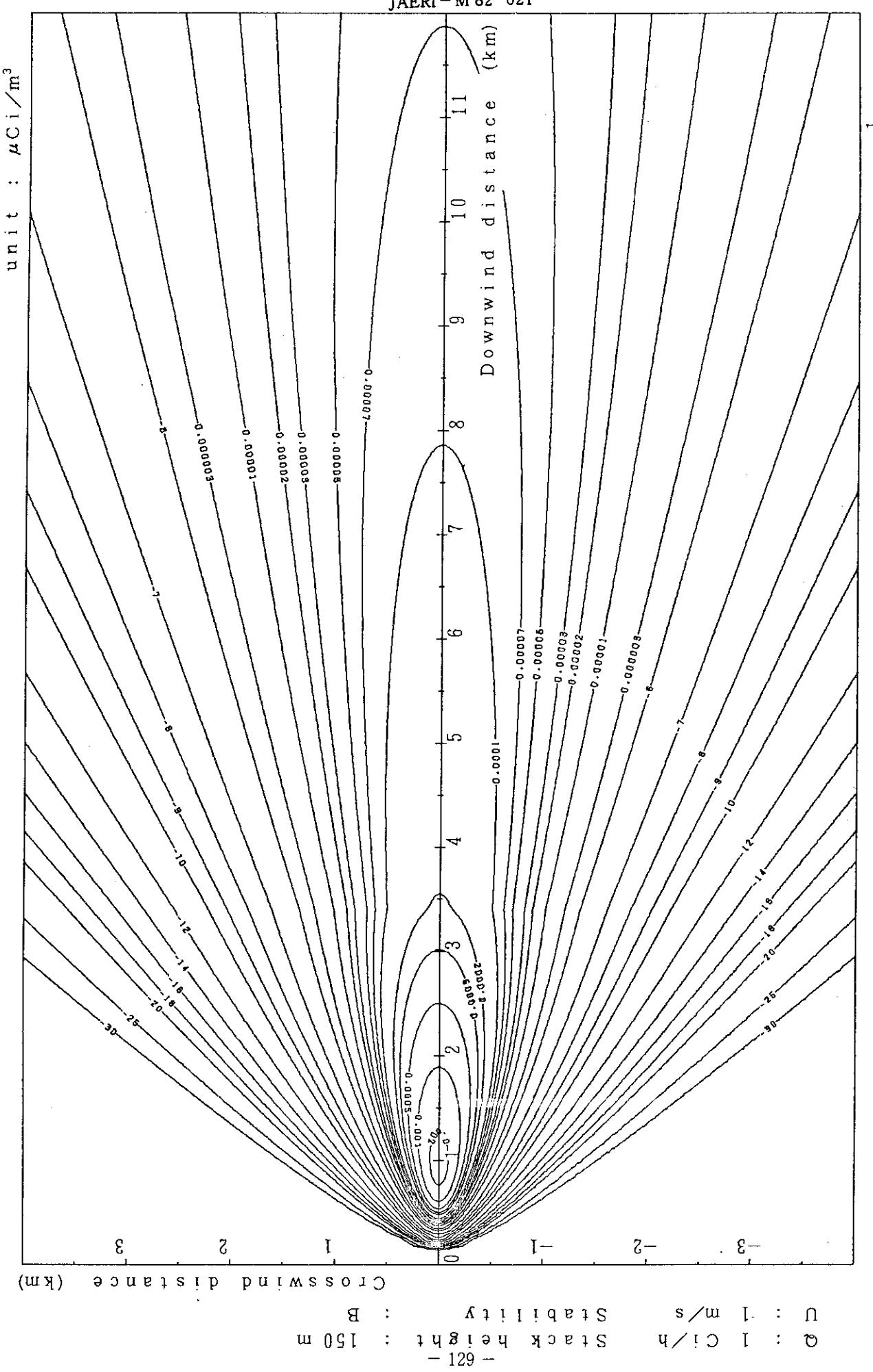


Fig. 2-10-2 (B) Isopleths of surface concentration

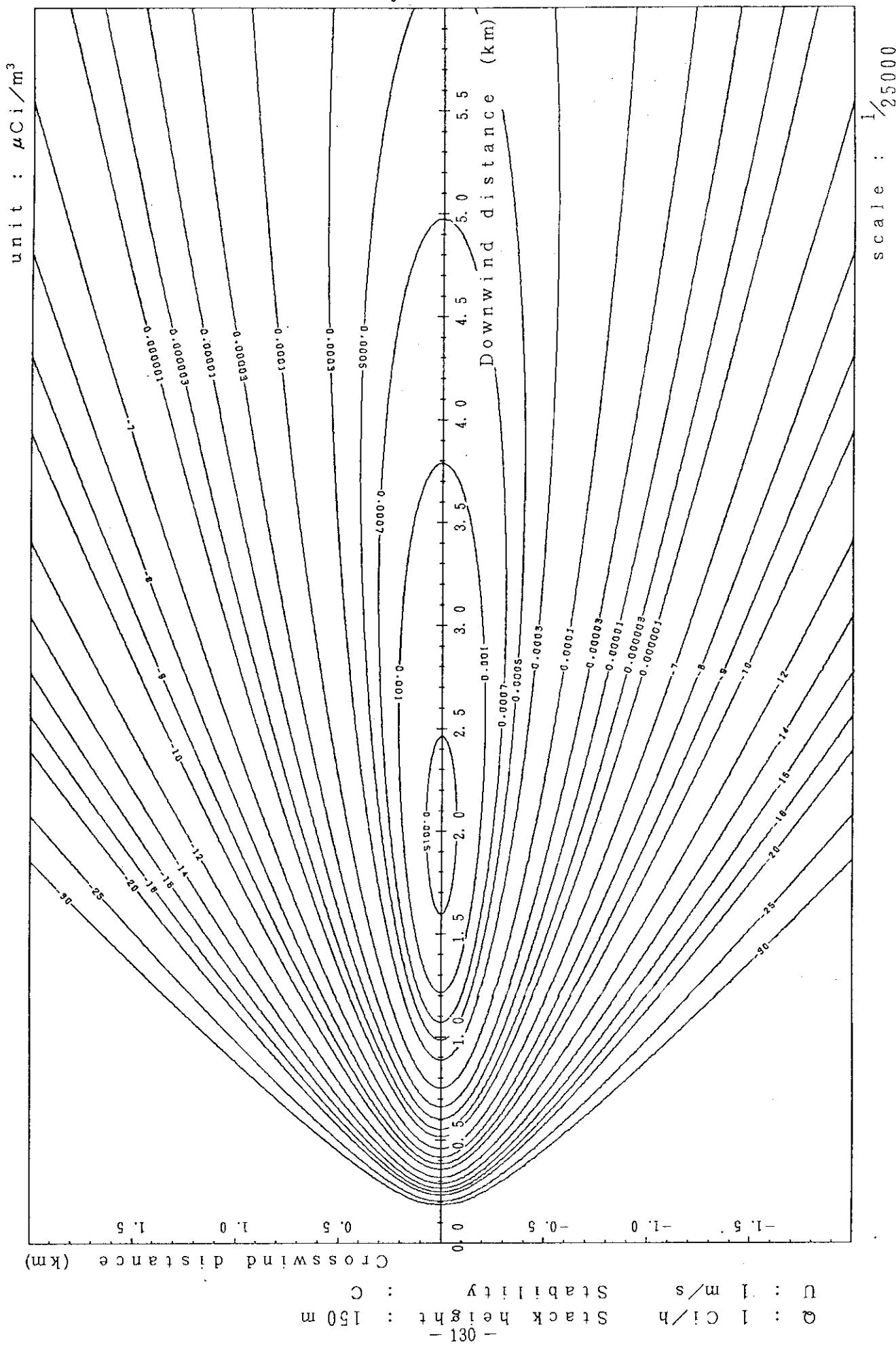


Fig. 2-10-3 (A) Isopleths of surface concentration

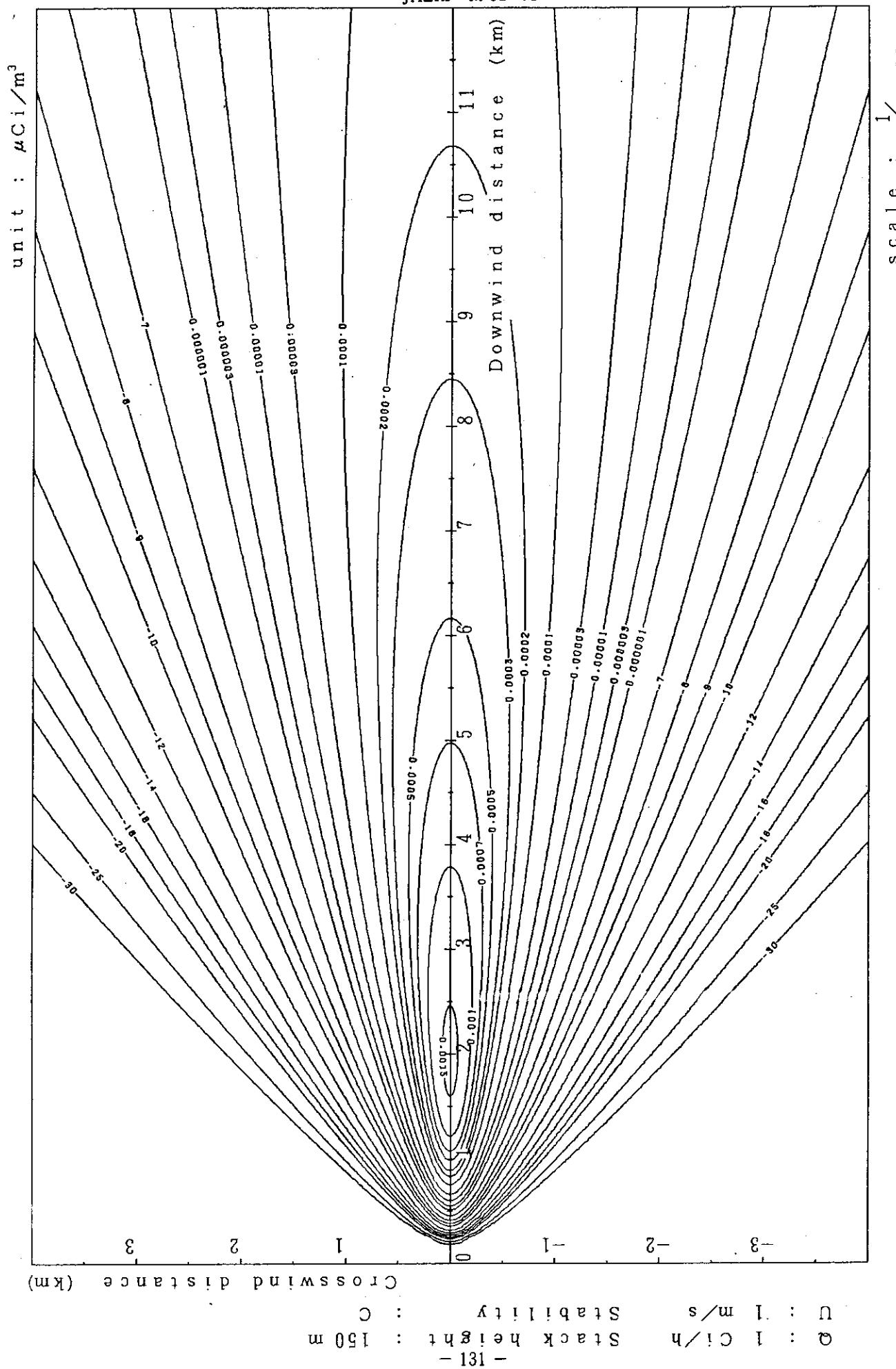


Fig. 2-10-3 (B) Isopleths of surface concentration

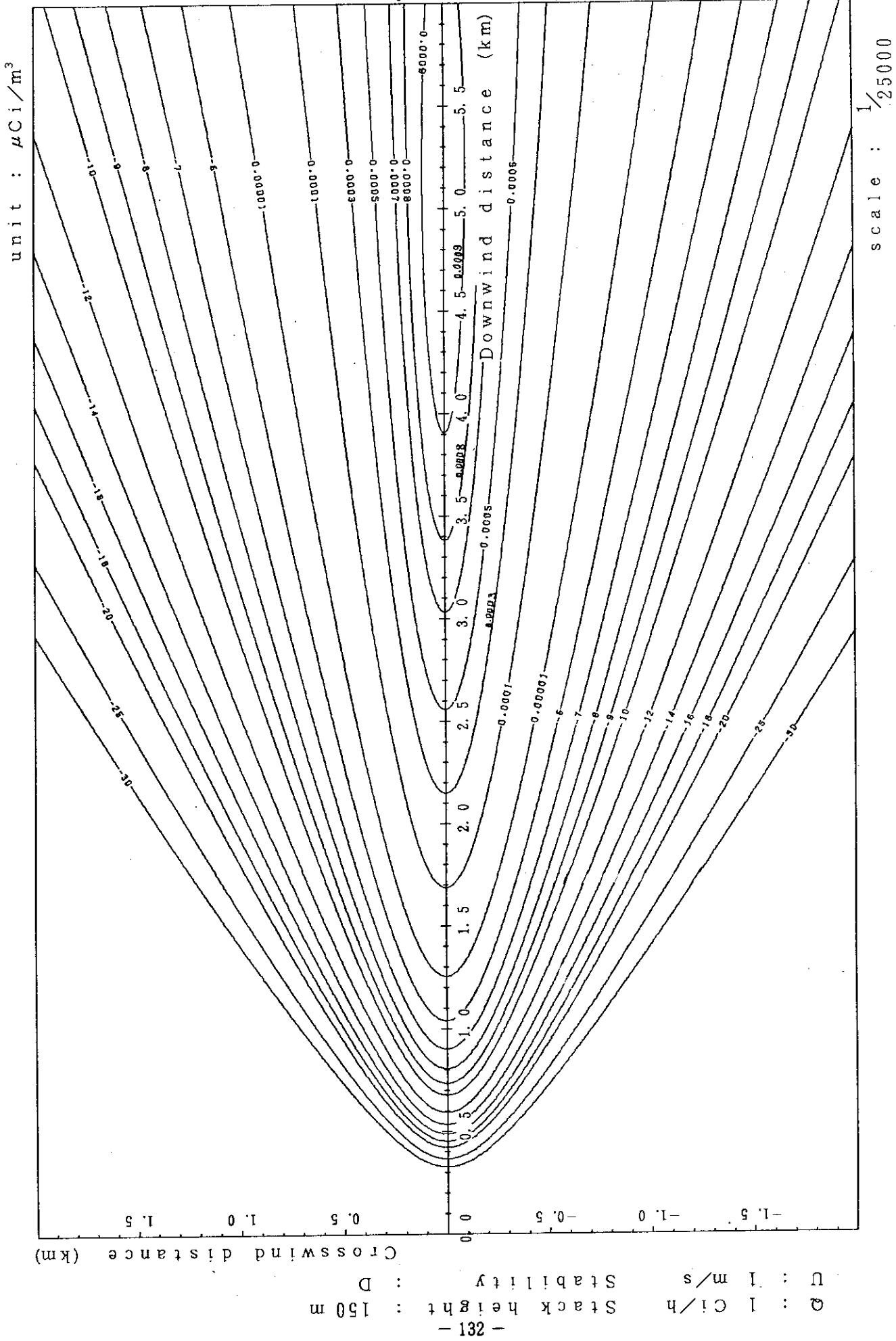


Fig. 2-10-4 (A) Isopleths of surface concentration

scale :  $1/25000$

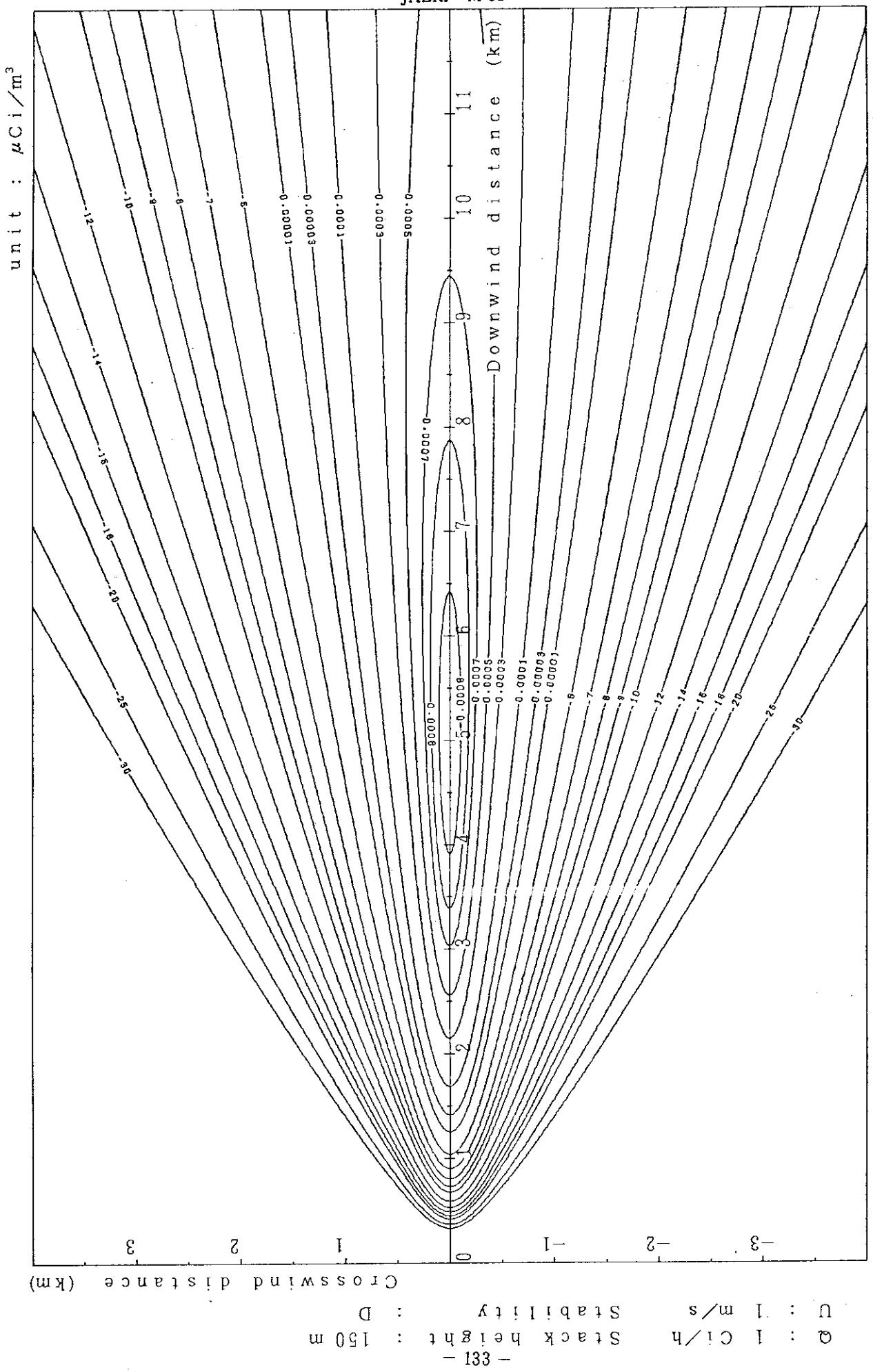


Fig. 2-10-4 (B) Isopleths of surface concentration

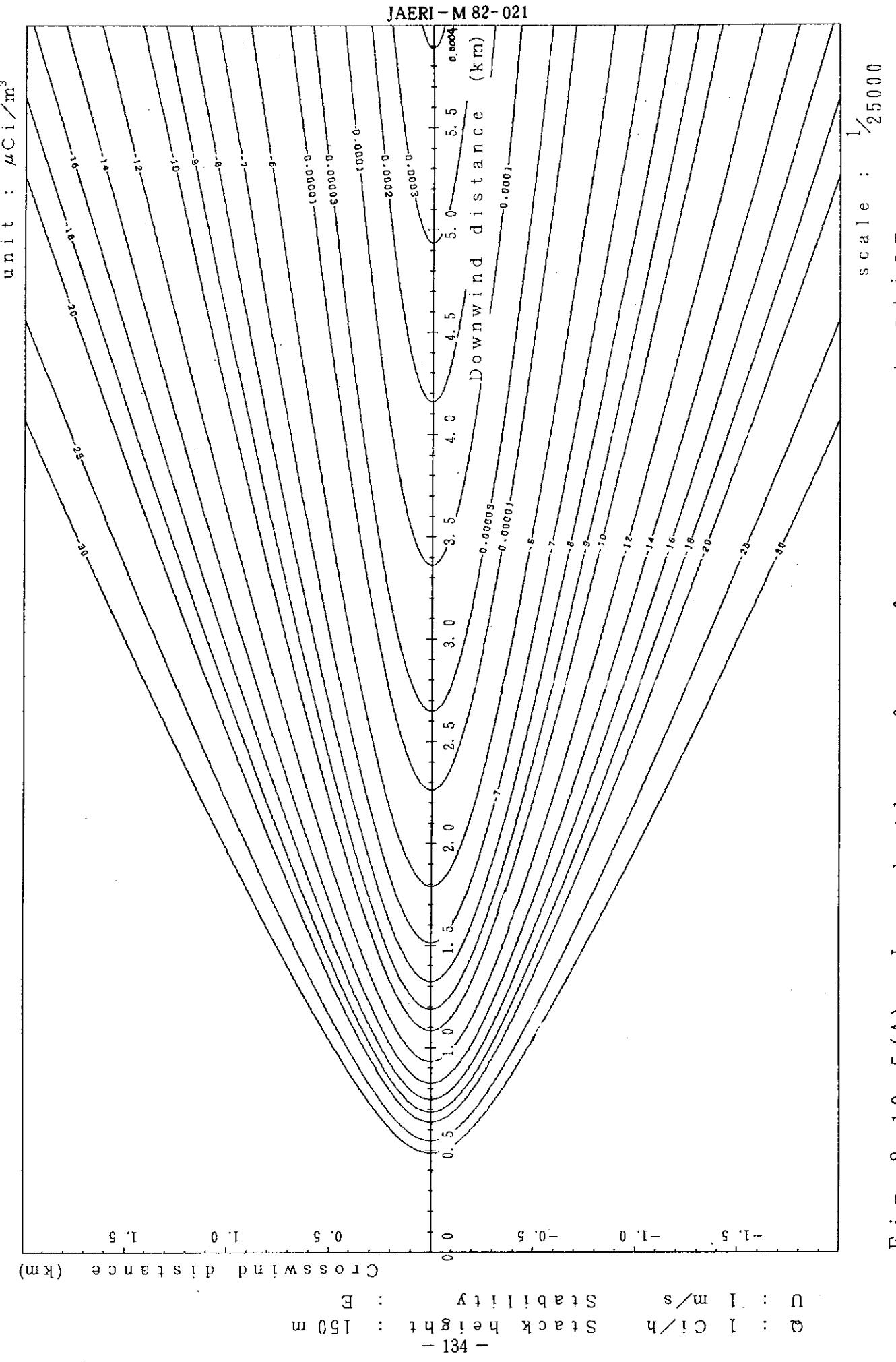


Fig. 2-10-5(A) Isopleths of surface concentration

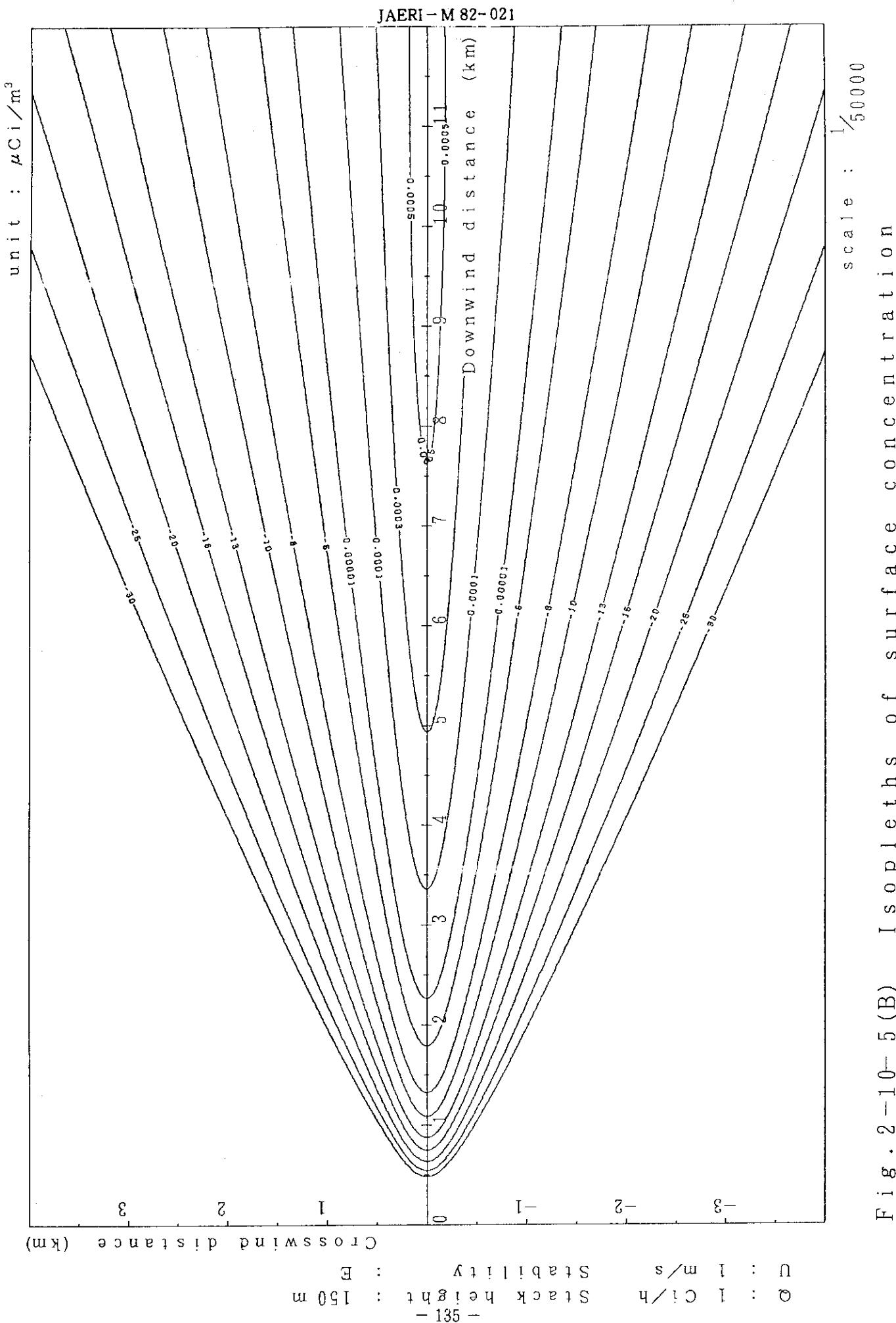


Fig. 2-10-5 (B) Isopleths of surface concentration

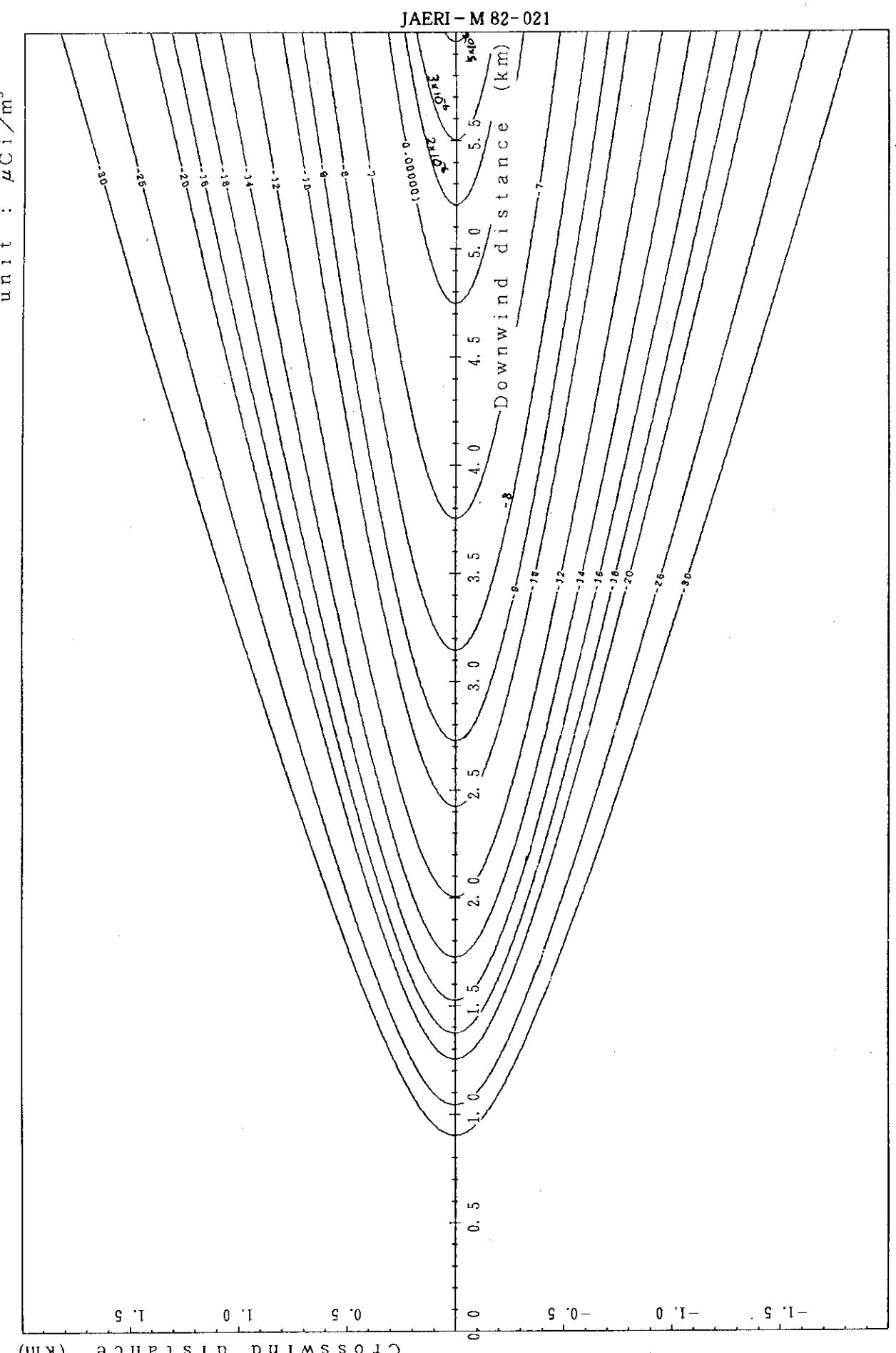


Fig. 2-10-6 (A) Isopleths of surface concentration

$Q$  :  $1 \text{ Ci/h}$  Stack height :  $150 \text{ m}$   $U$  :  $1 \text{ m/s}$  Stability : F

- 136 -

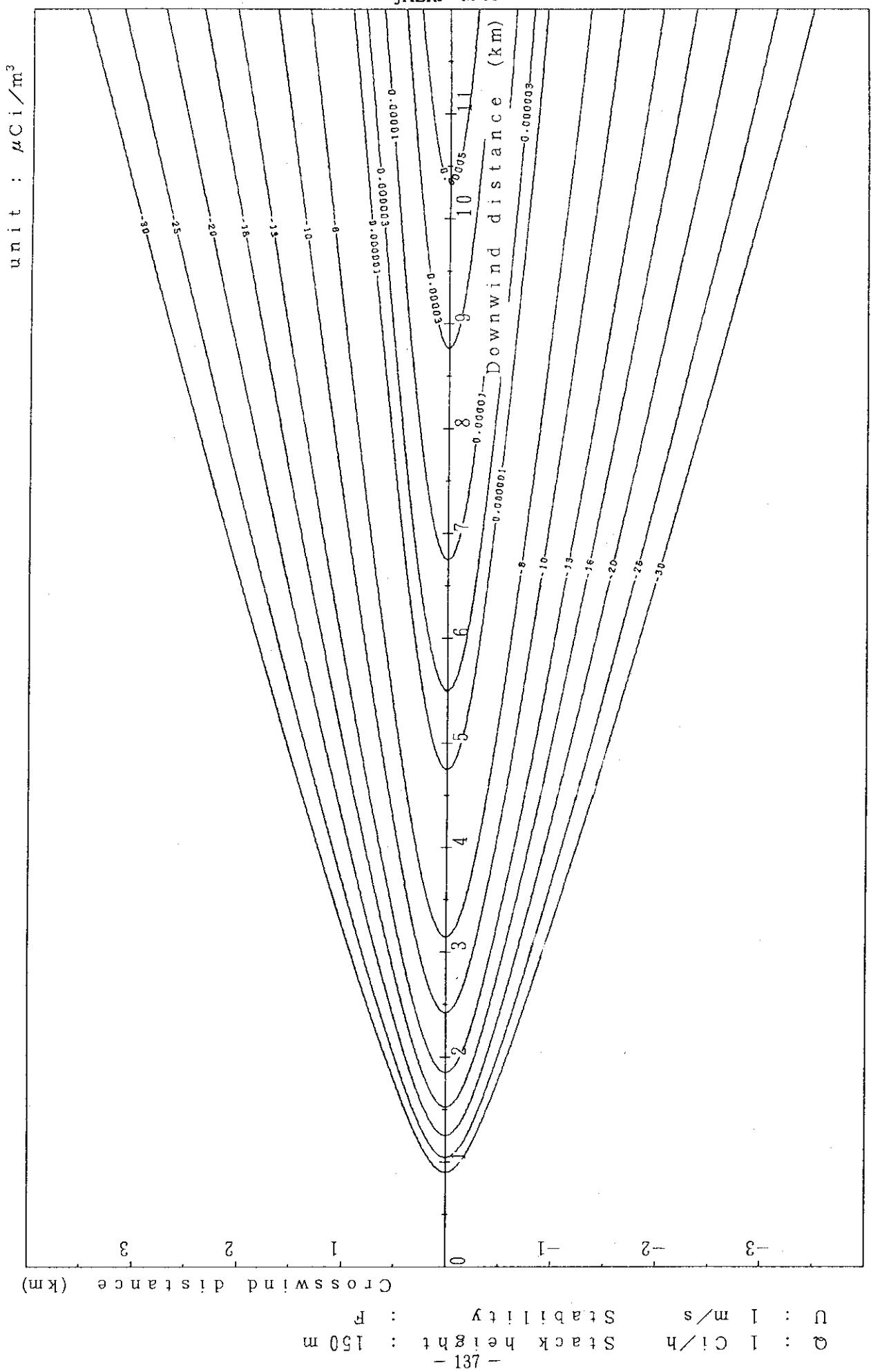


Fig. 2-10-6 (B) Isopleths of surface concentration

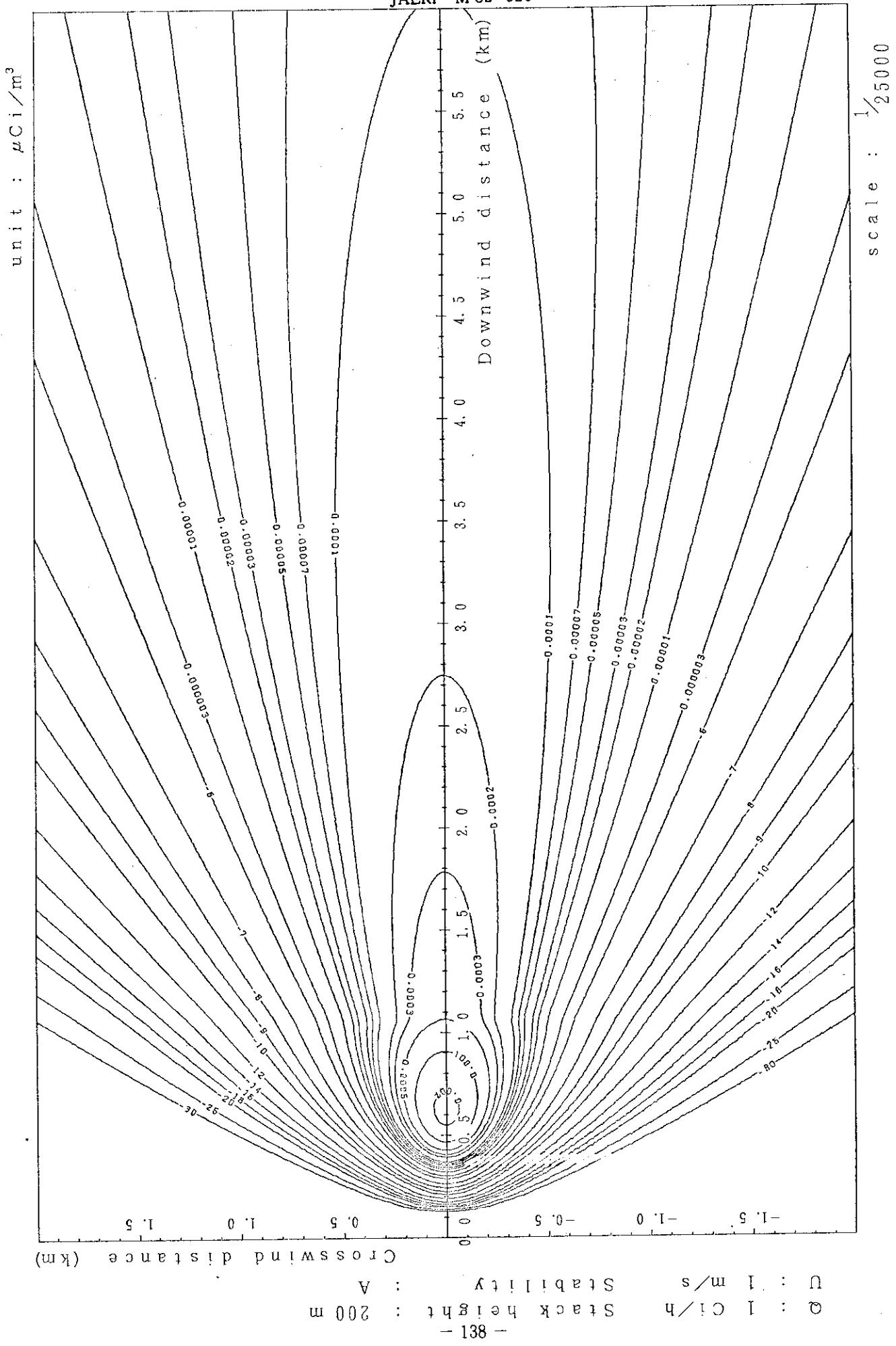


Fig. 2-11-1 (A) Isopleths of surface concentration

scale :  $1/25000$

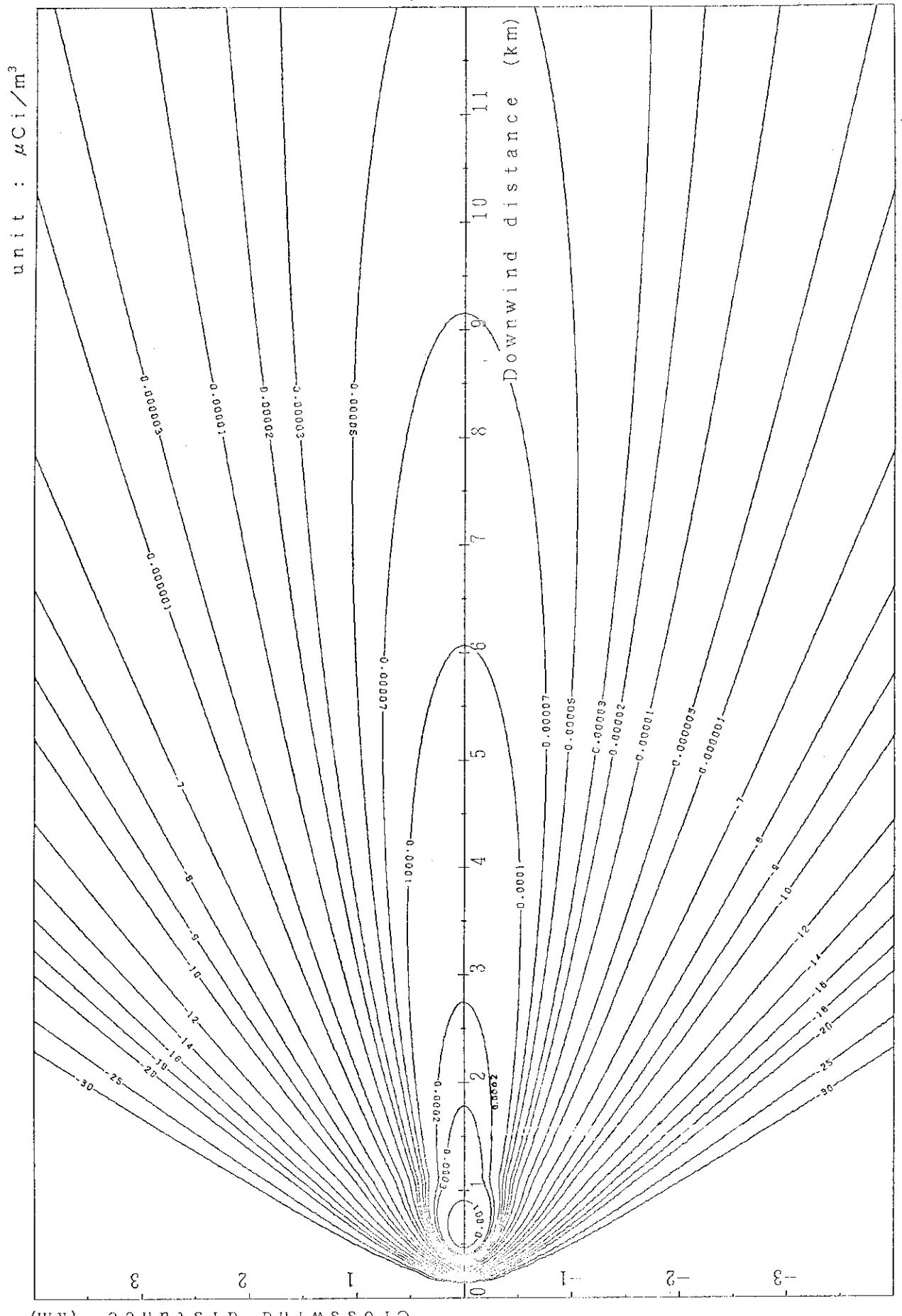


Fig. 2-11-1(B) Isopleths of surface concentration

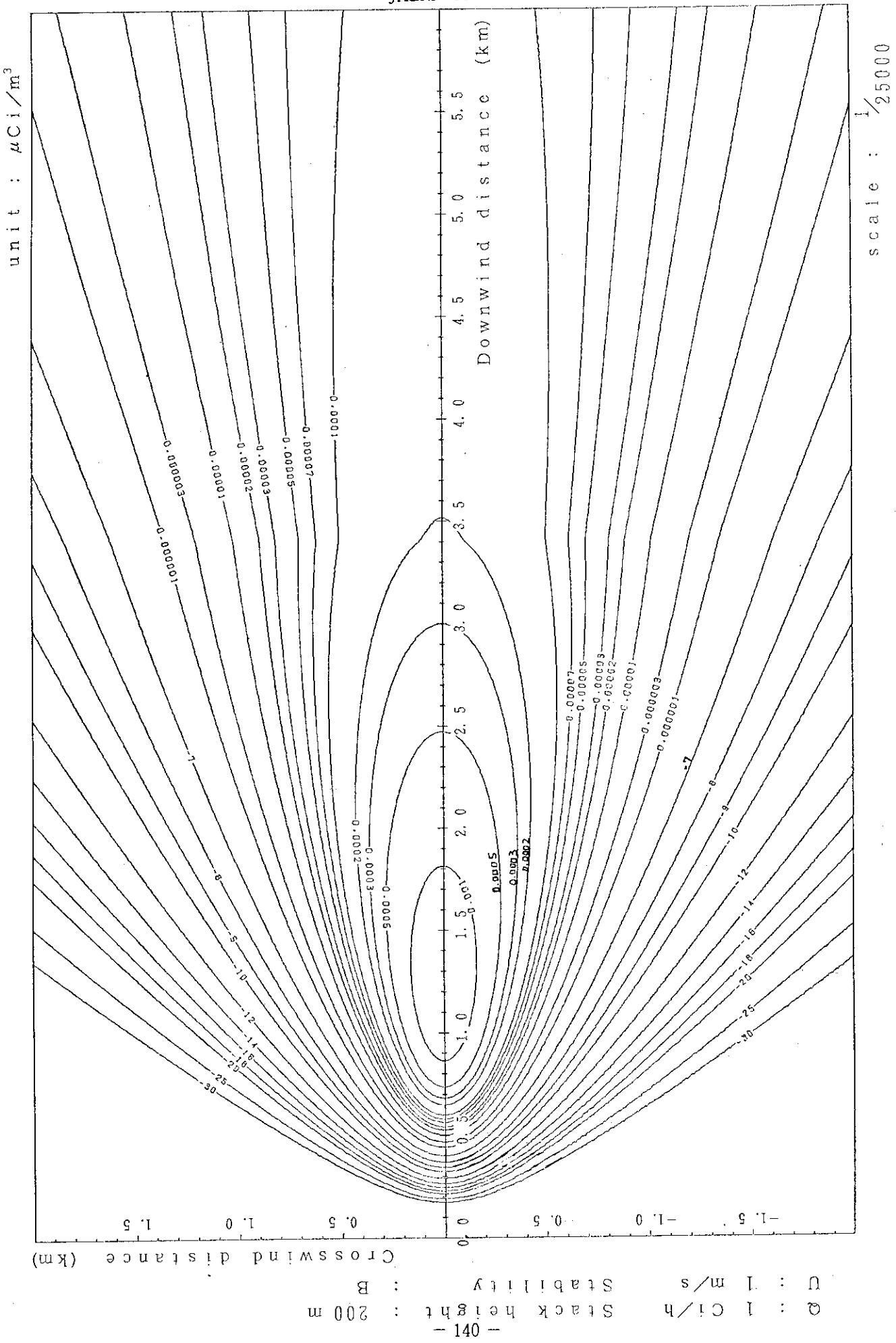


Fig. 2-11-2 (A) Isopleths of surface concentration

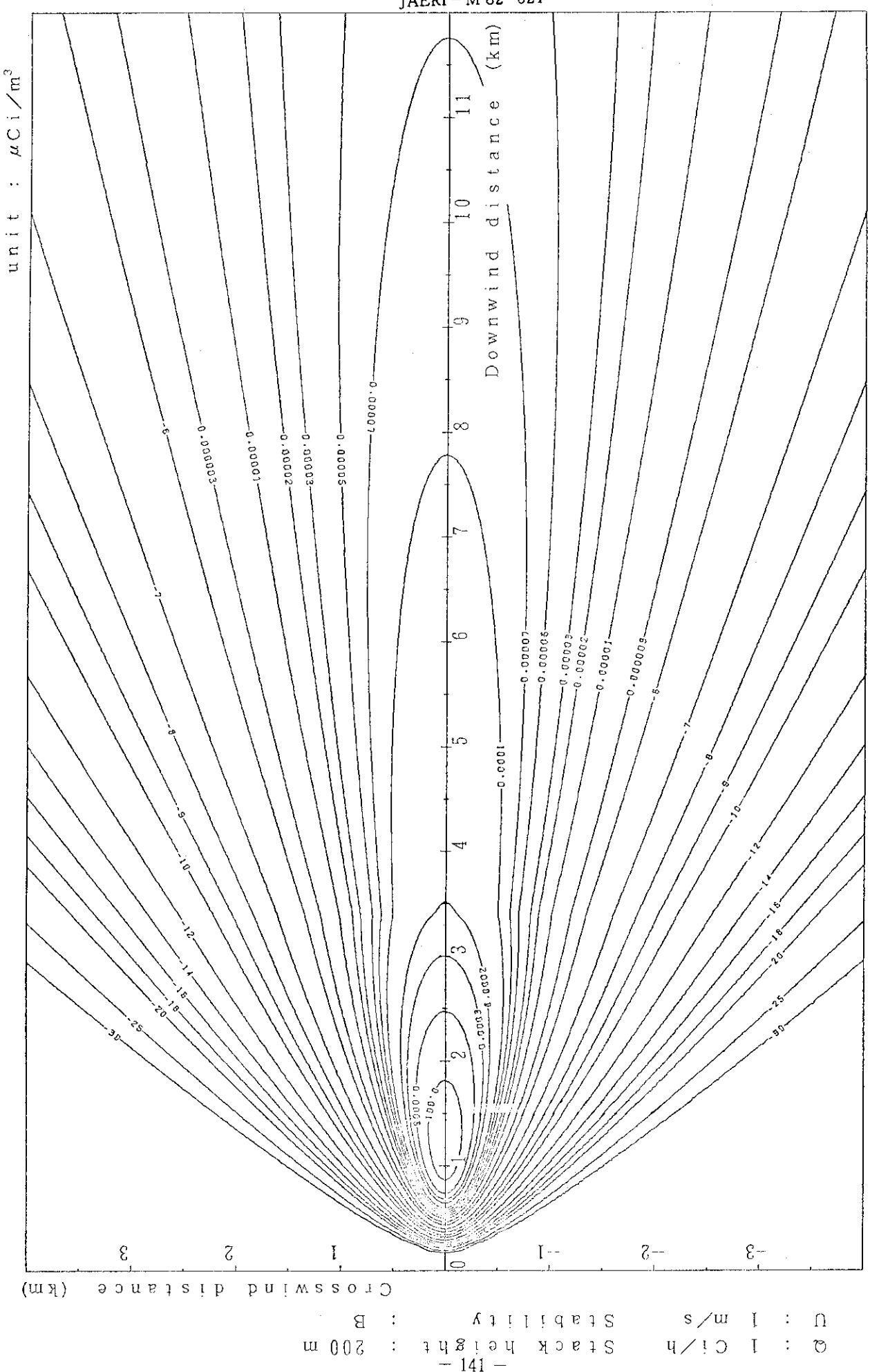


Fig. 2-11-2(B) Isopleths of surface concentration

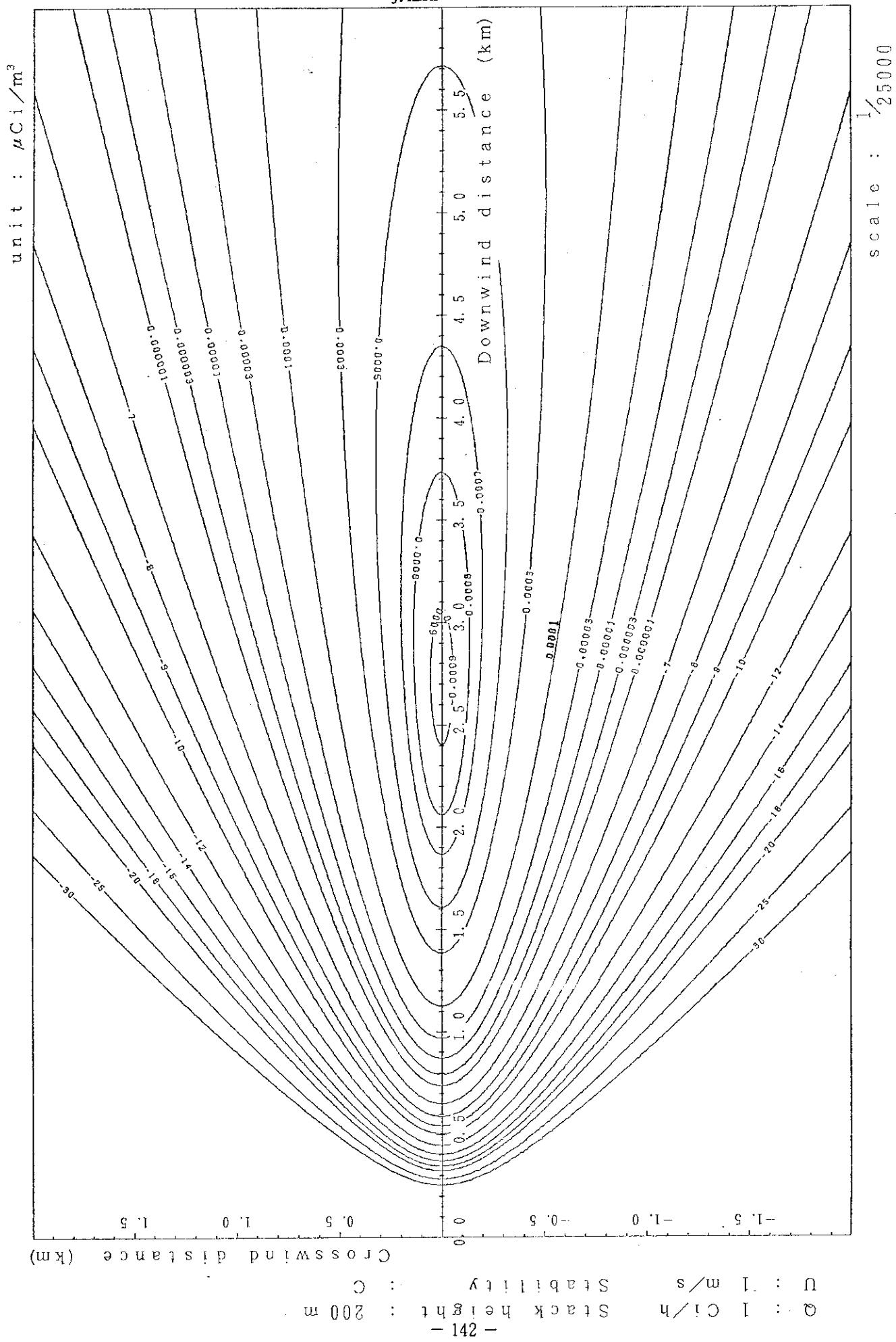


Fig. 2-11-3 (A) Isopleths of surface concentration

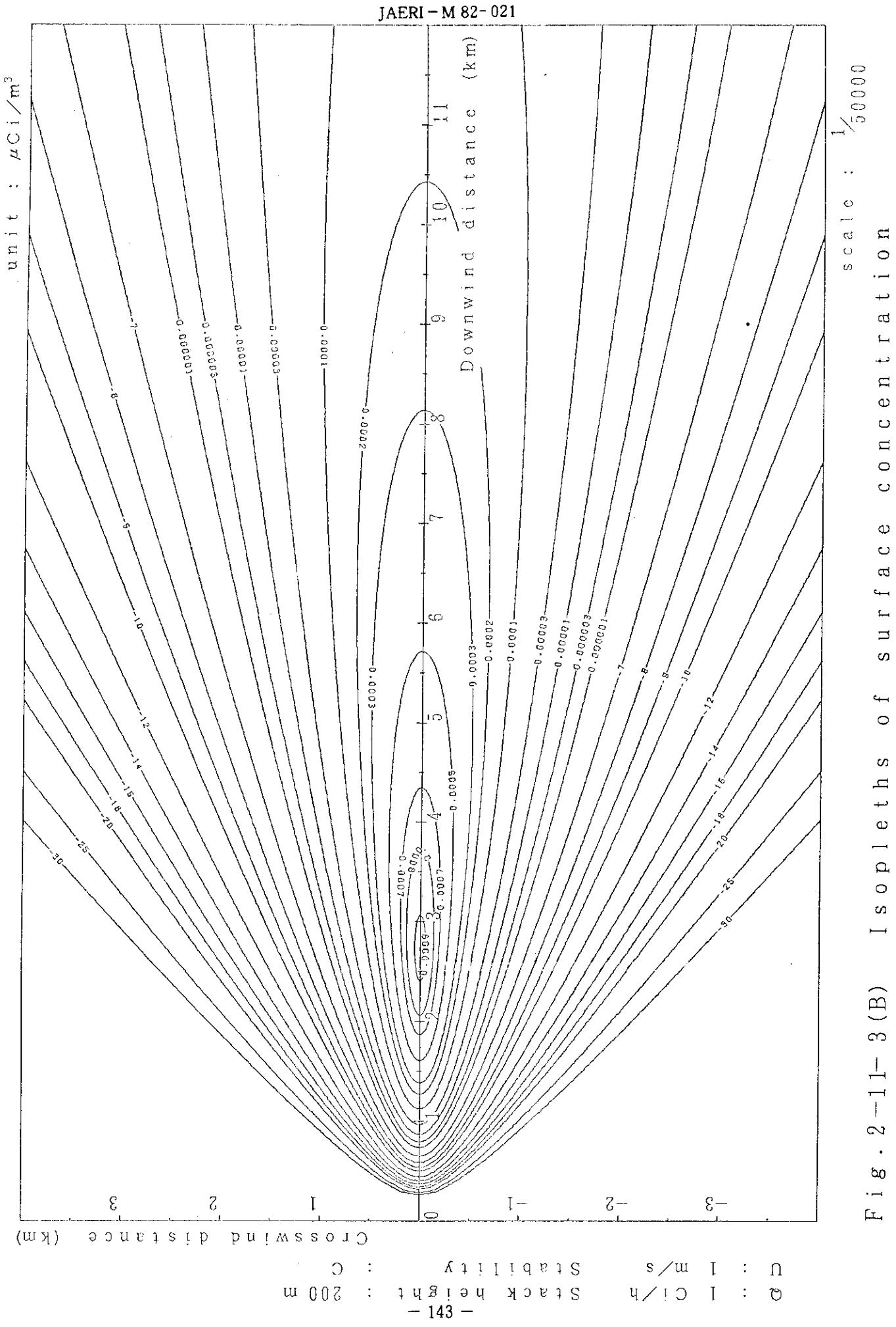


Fig. 2-11-3(B) Isopleths of surface concentration

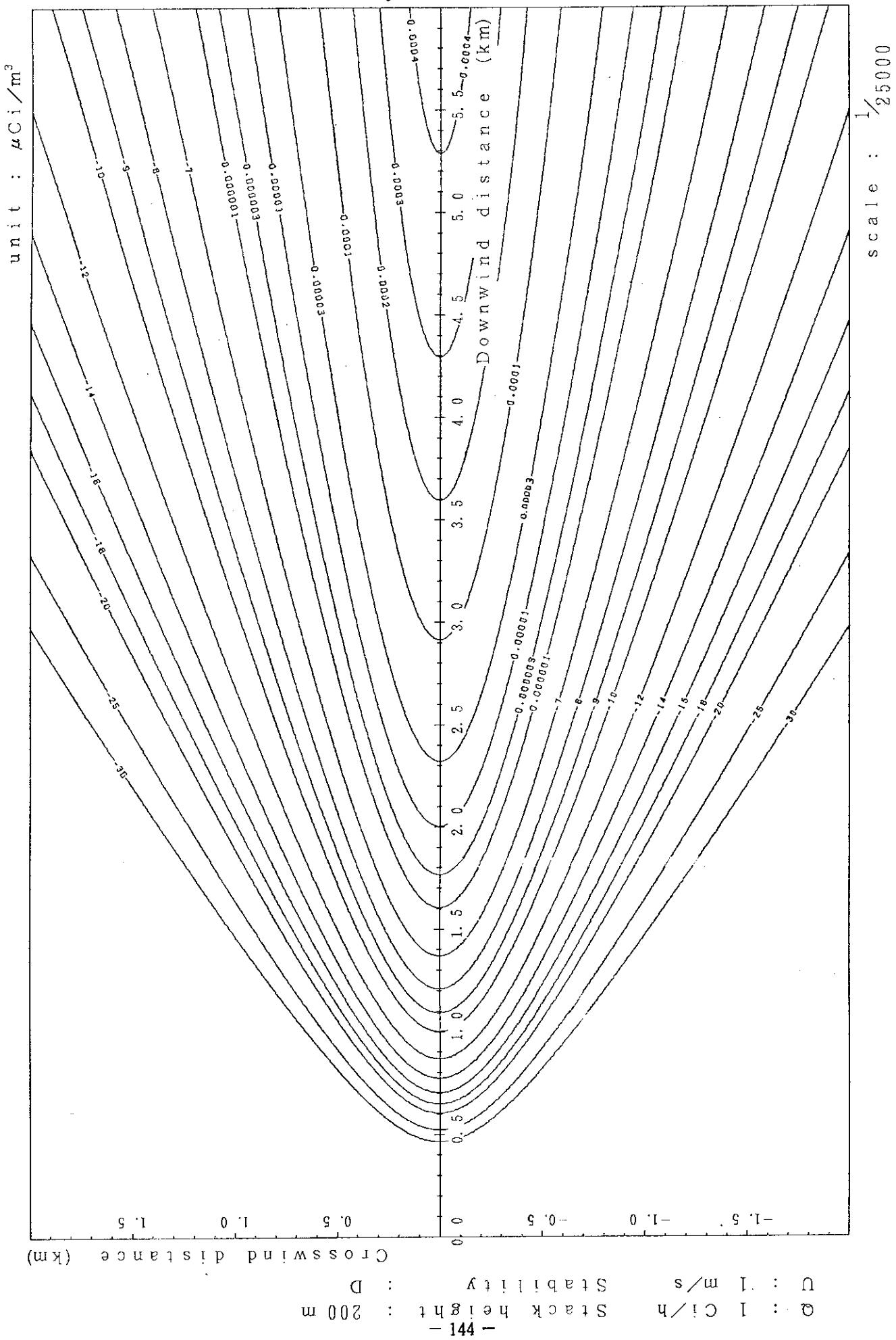


Fig. 2-11-4 (A) Isopleths of surface concentration

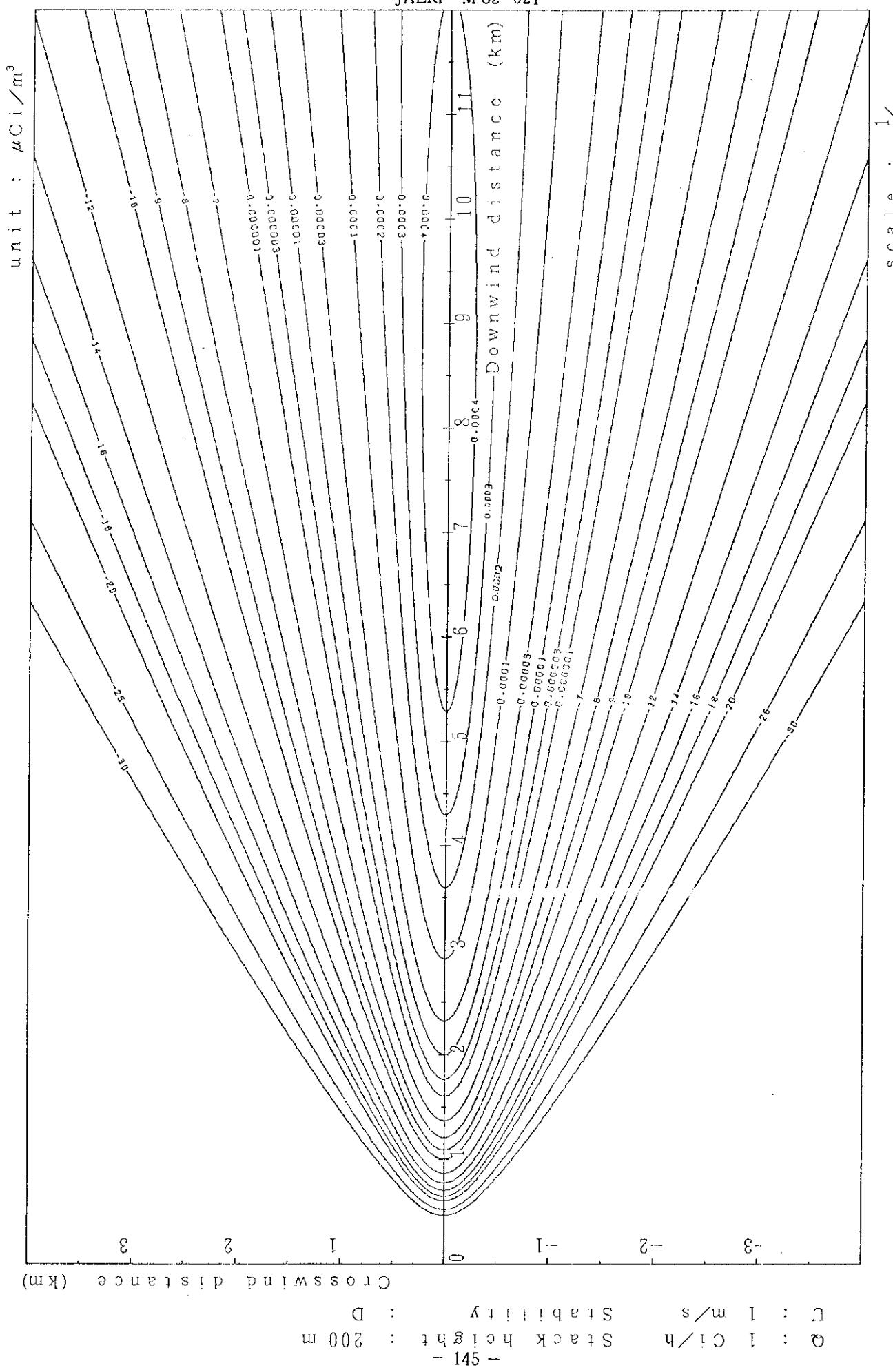


Fig. 2-11-4 (B) Isopleths of surface concentration

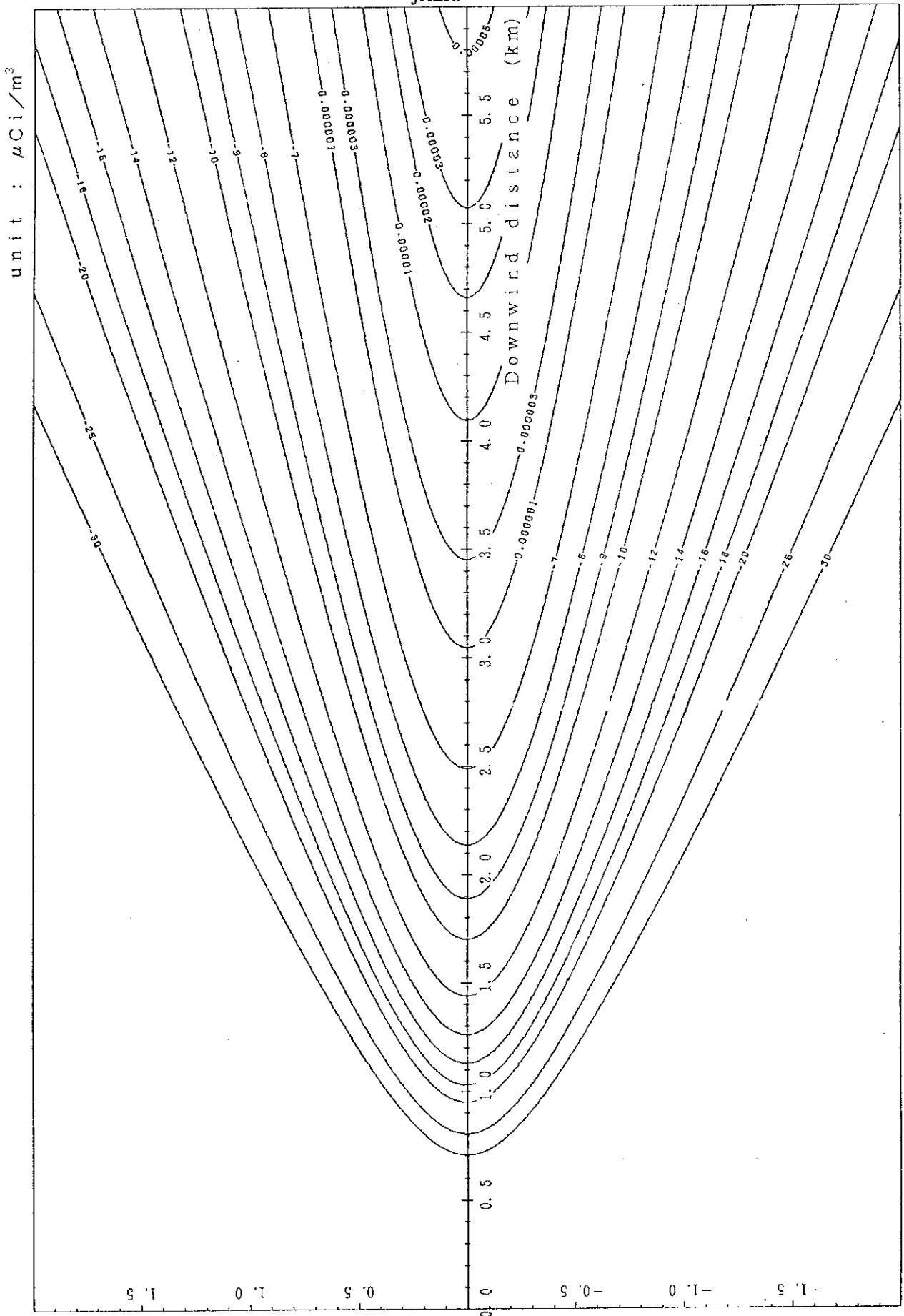


Fig. 2-11-5 (A)

$U : 1 \text{ m/s}$        $S t a b i l i t y : E$   
 $Q : 1 \text{ Ci/h}$        $S t a c k \text{ height} : 200 \text{ m}$

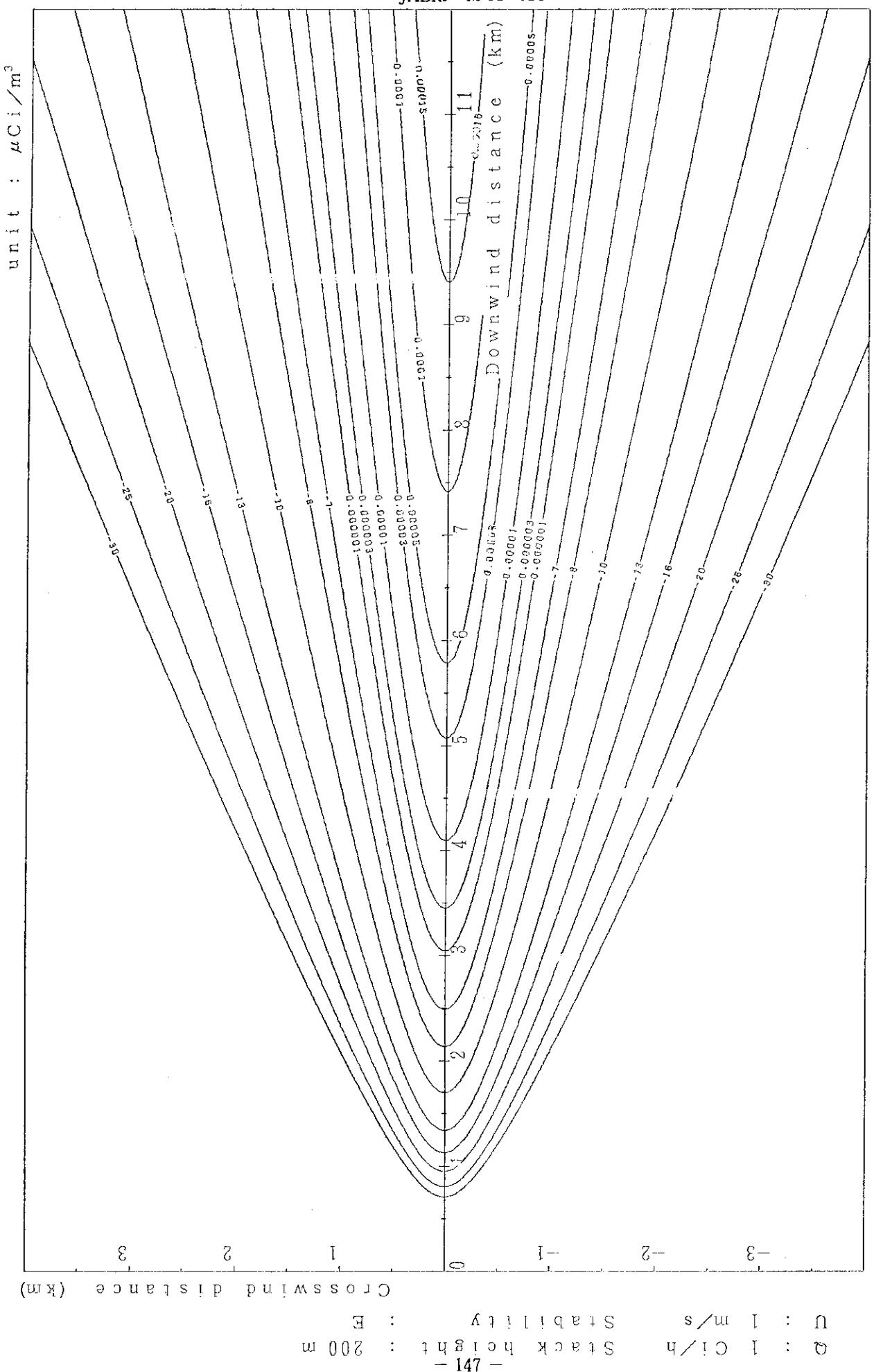


Fig. 2-11-5(B) Isopleths of surface concentration

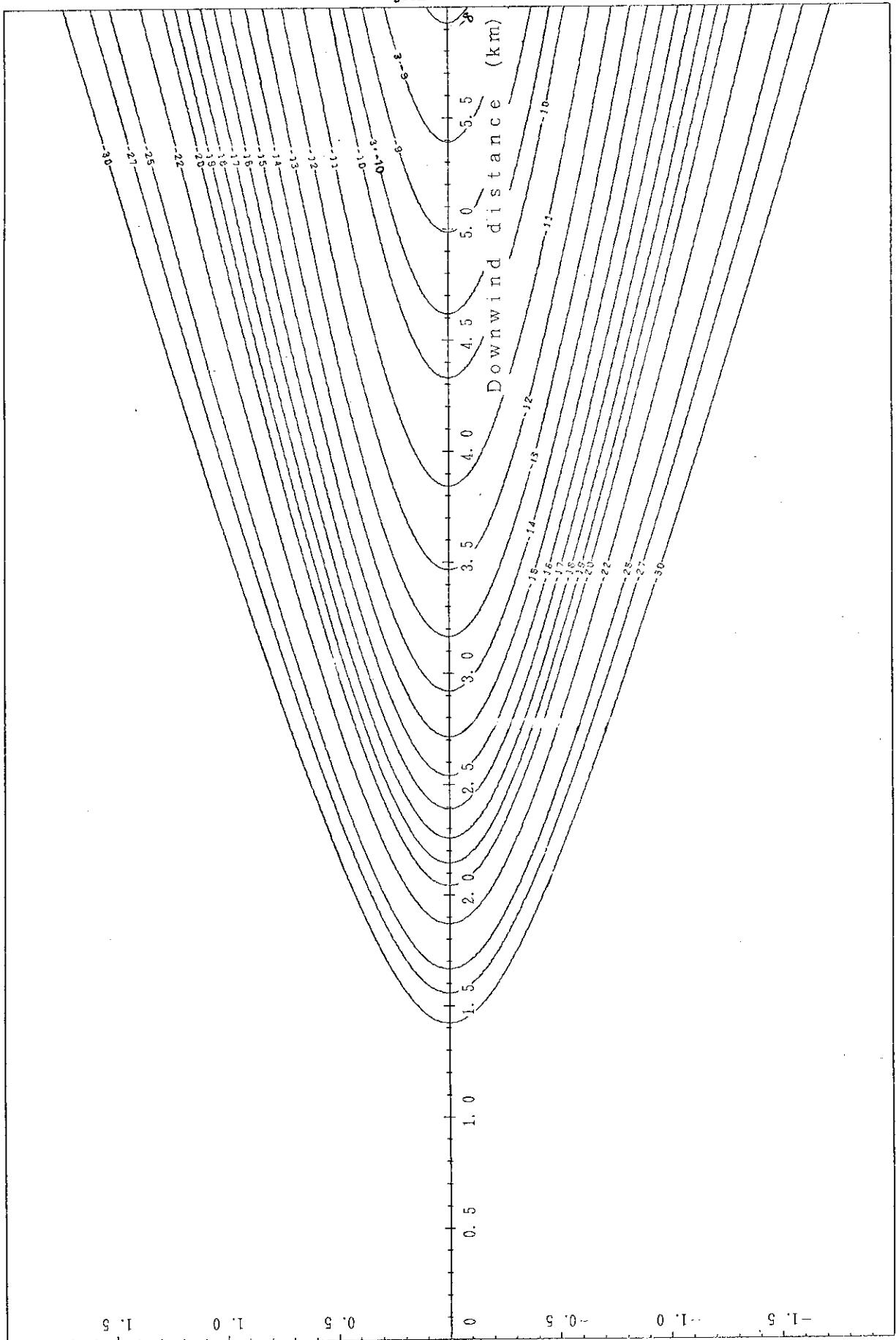
unit :  $\mu\text{Ci}/\text{m}^3$ 

Fig. 2-11-6 (A) Isopleths of surface concentration

$Q$  :  $1 \text{ Ci/h}$  Stack height :  $200 \text{ m}$   $U$  :  $1 \text{ m/s}$  Stability : F

- 148 -

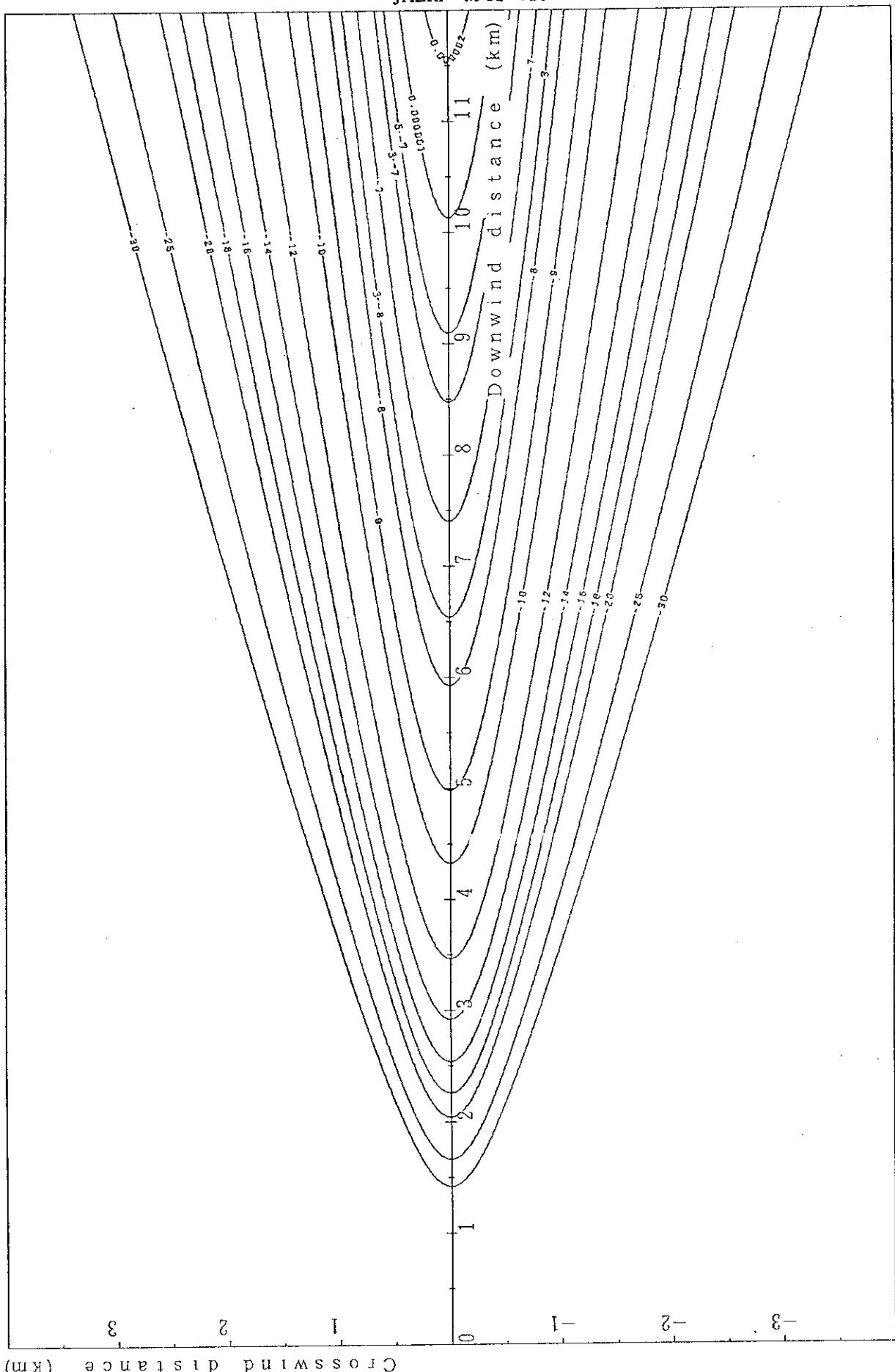
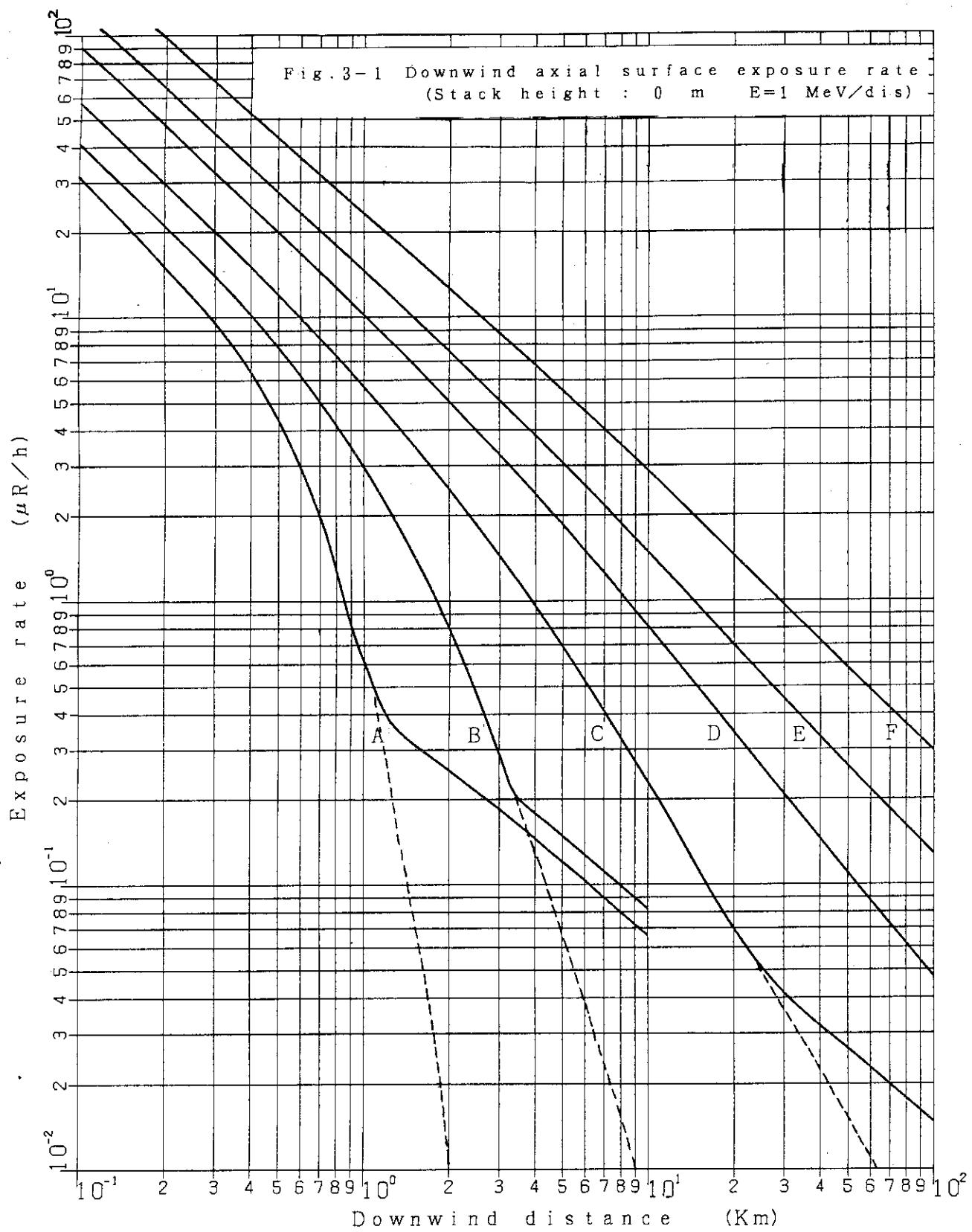
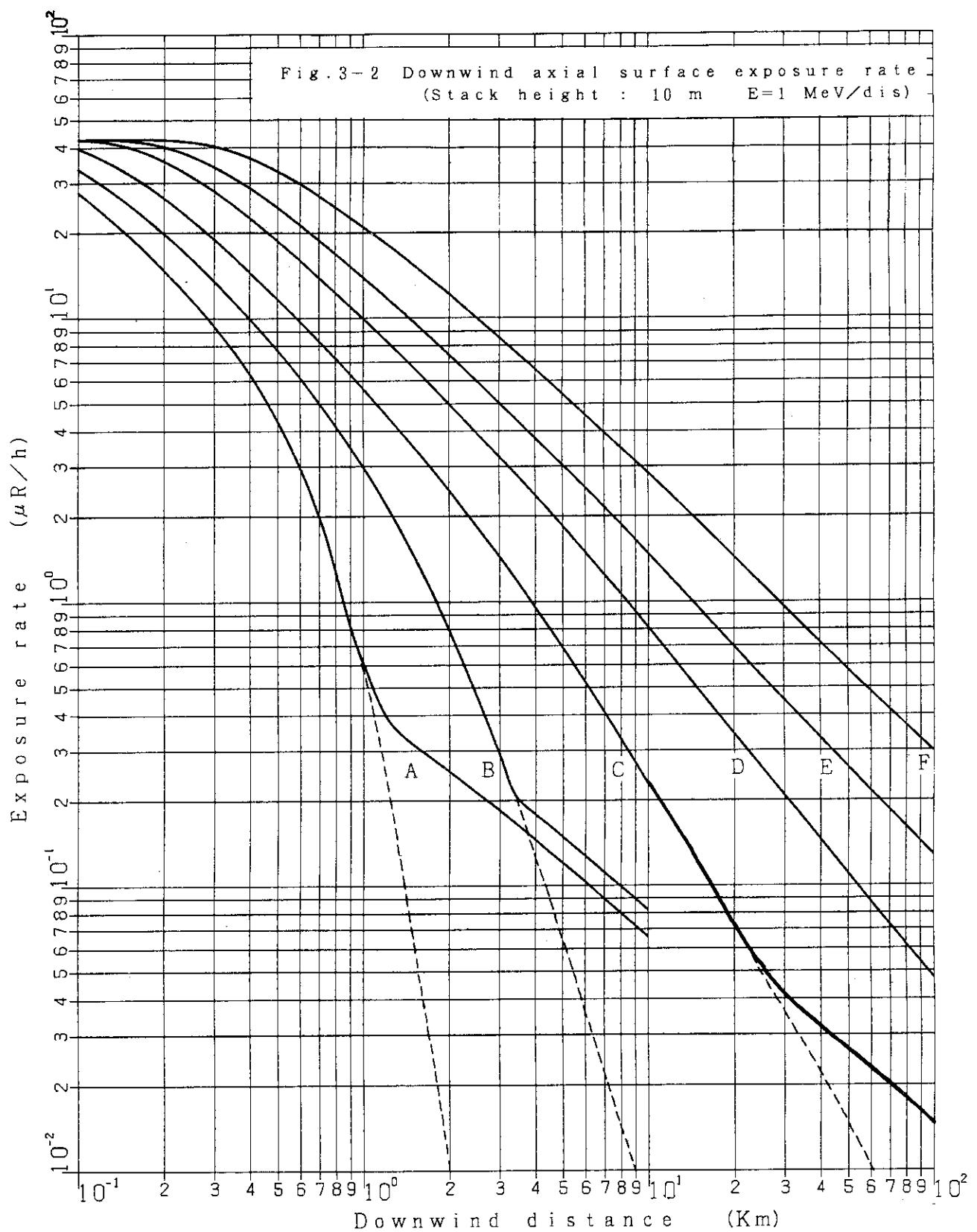
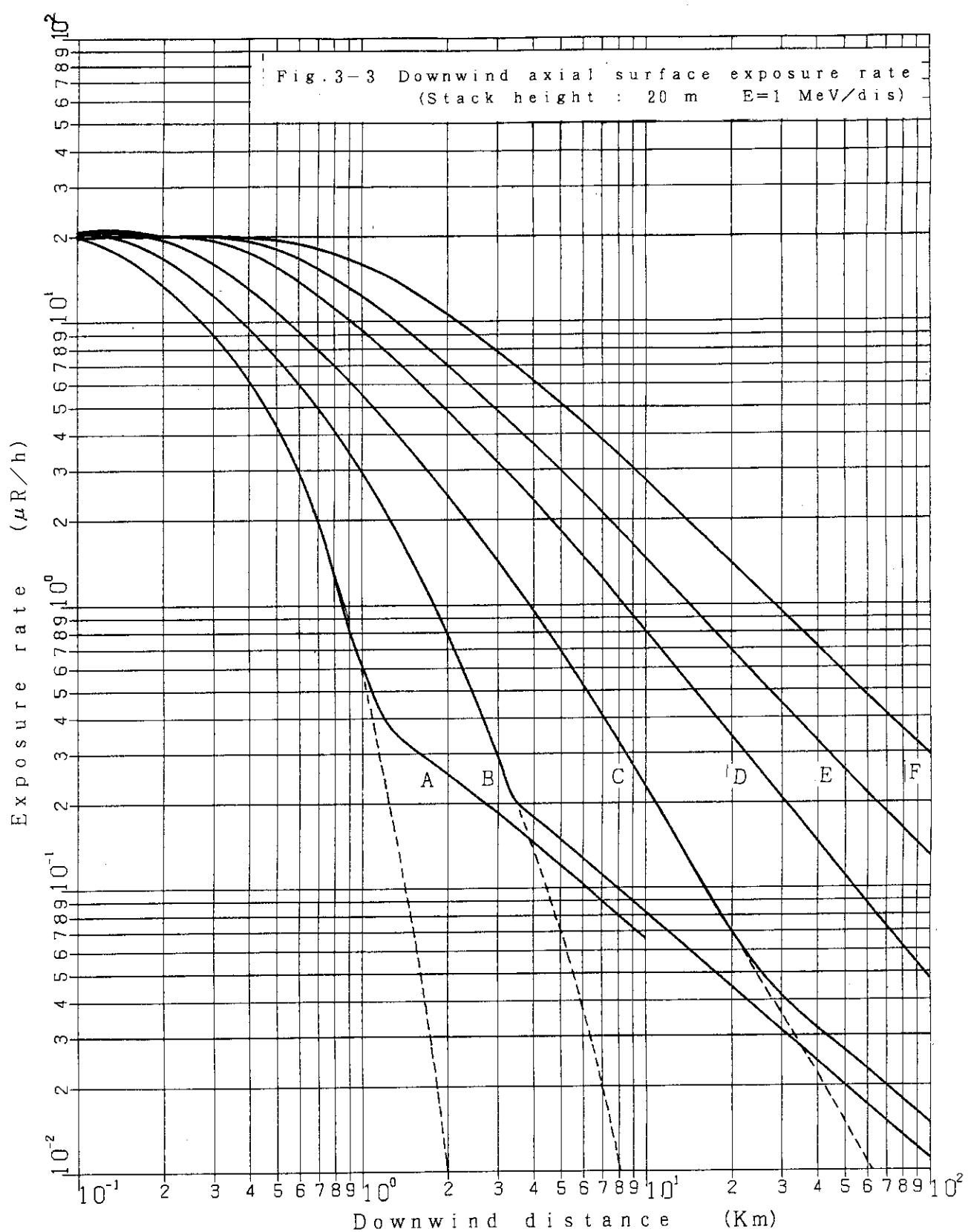
unit :  $\mu\text{Ci}/\text{m}^3$ scale :  $1/50000$ 

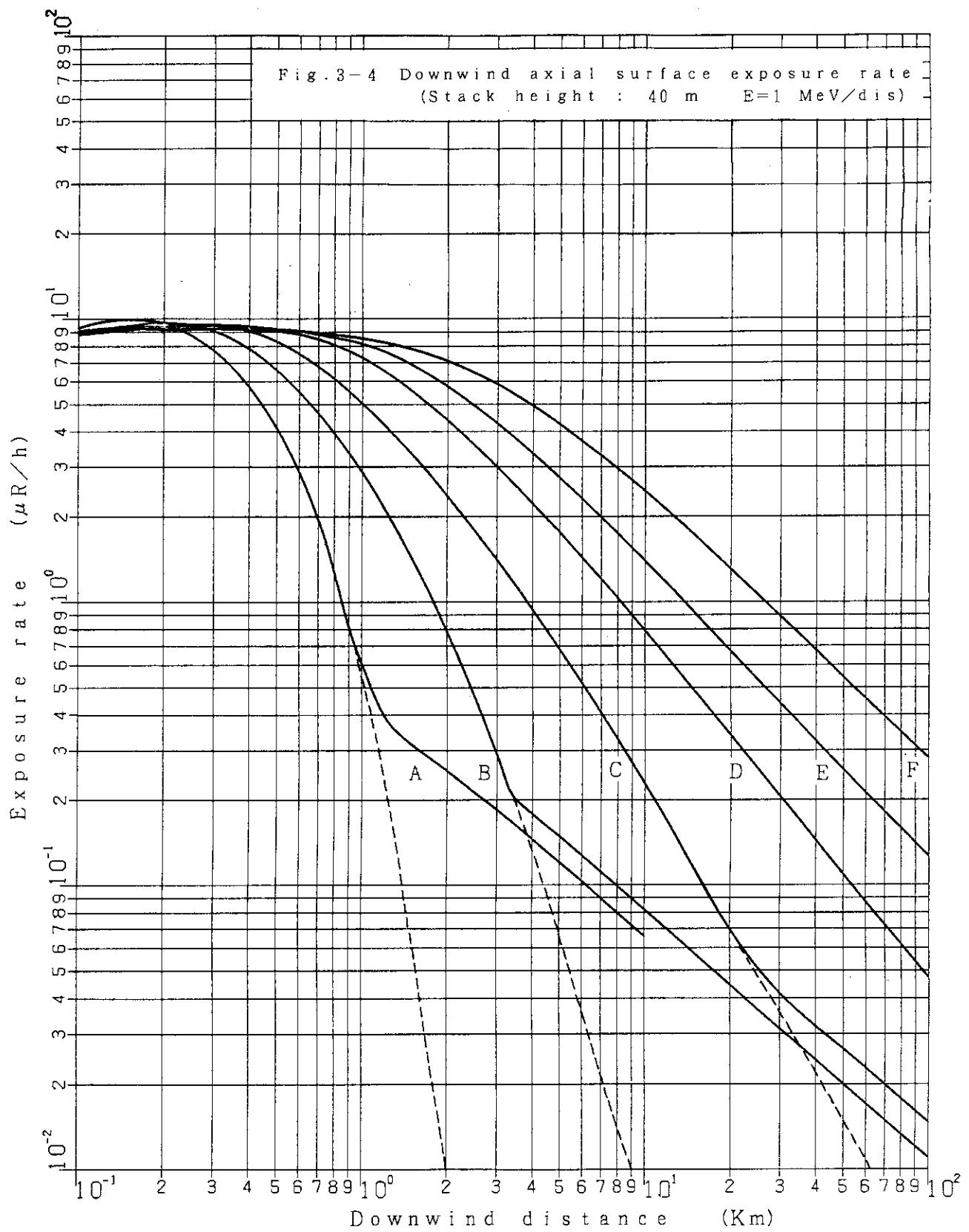
Fig. 2-11-6 (B) Isopleths of surface concentration

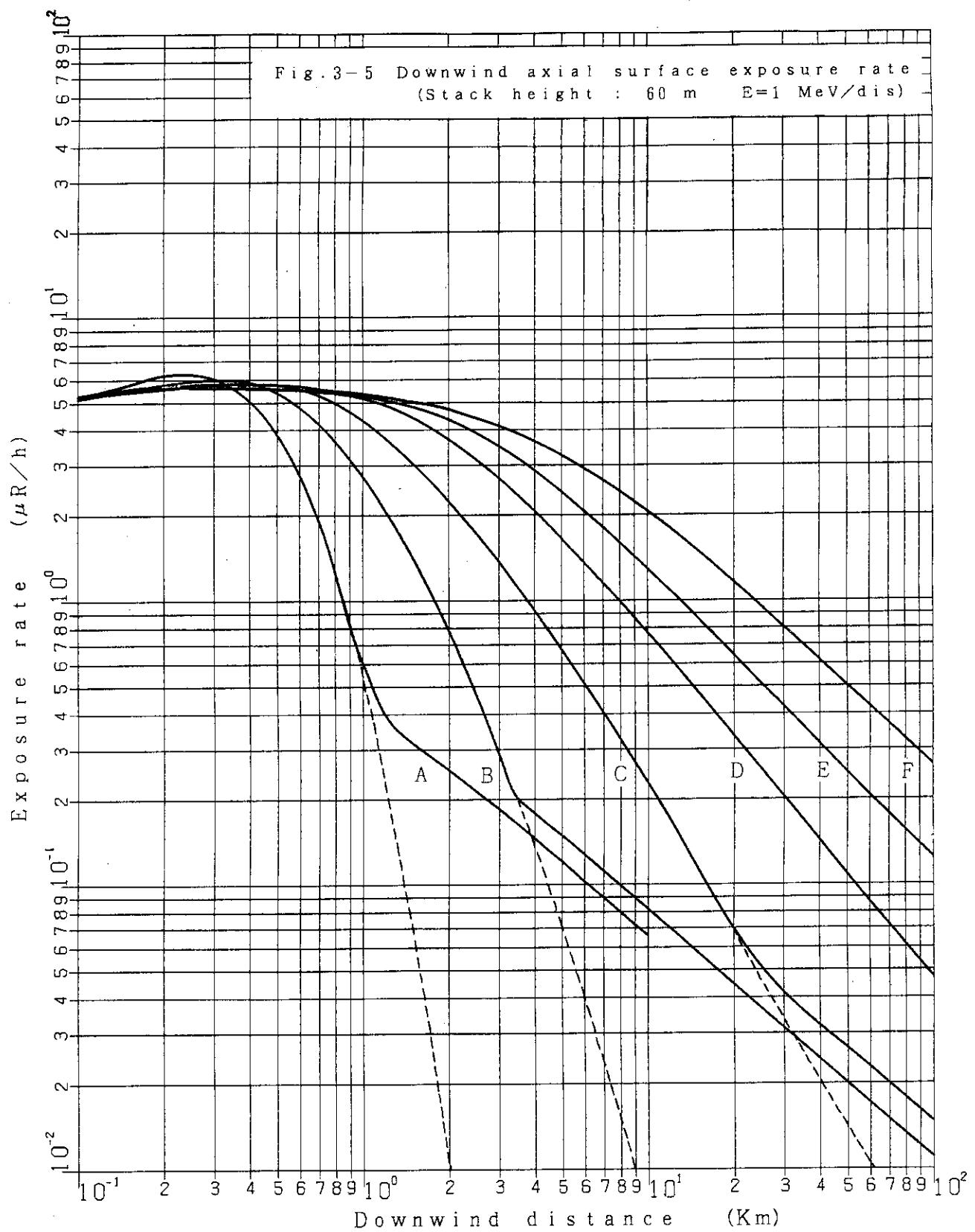
$U : 1 \text{ m/s}$  Stabillity : F  
 $Q : 1 \text{ Ci/h}$  Stack height : 200 m  
 unit :  $\mu\text{Ci}/\text{m}^3$

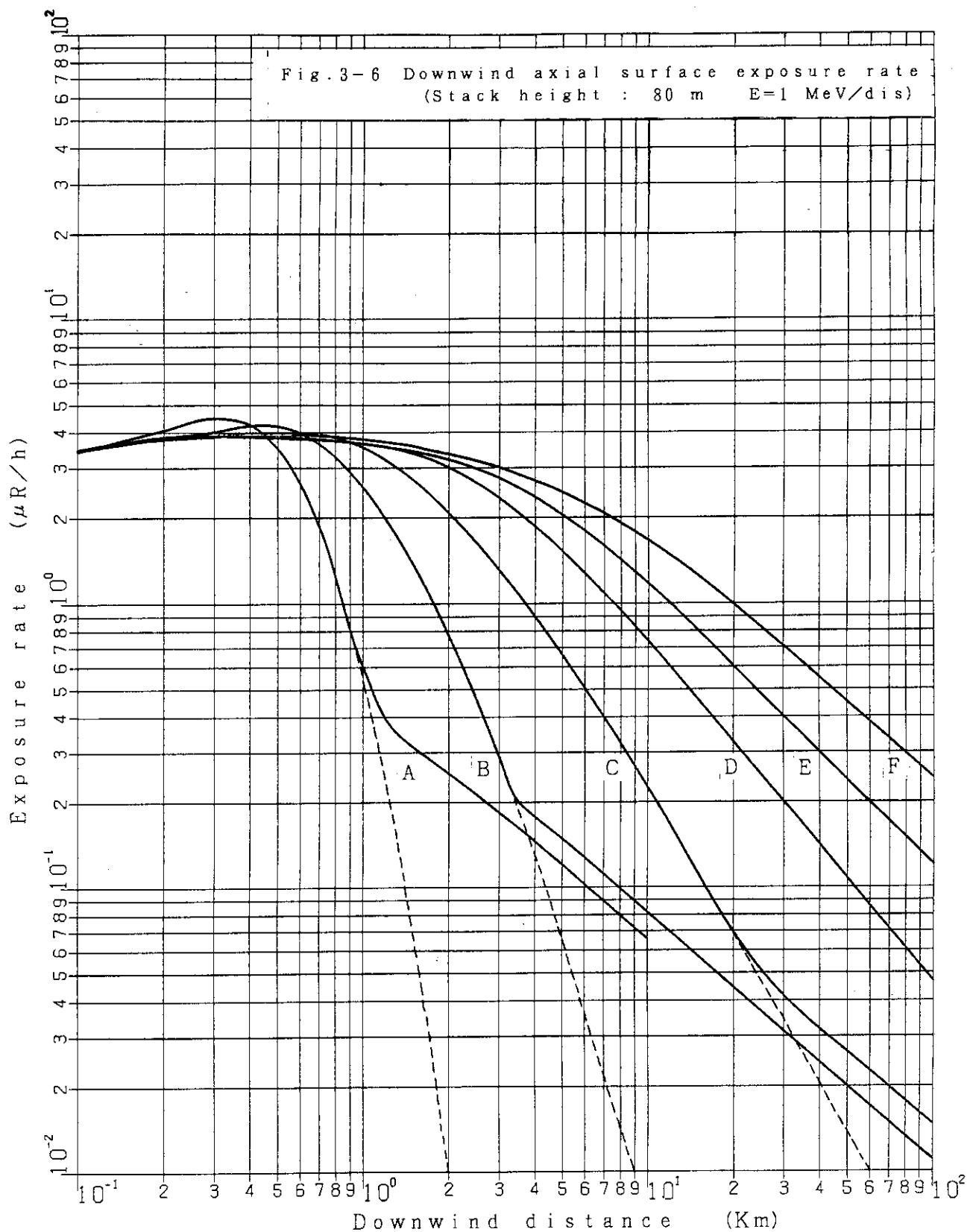


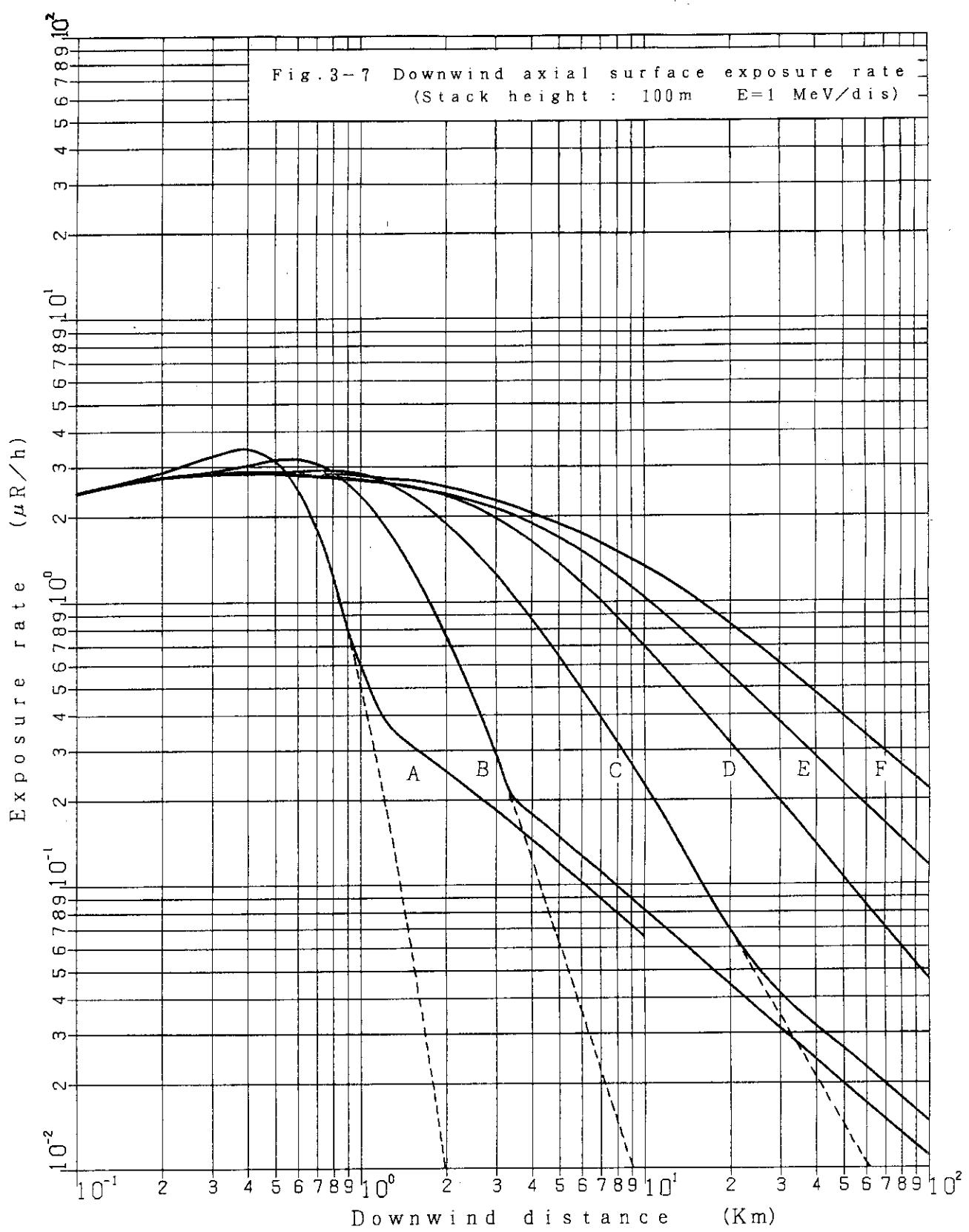


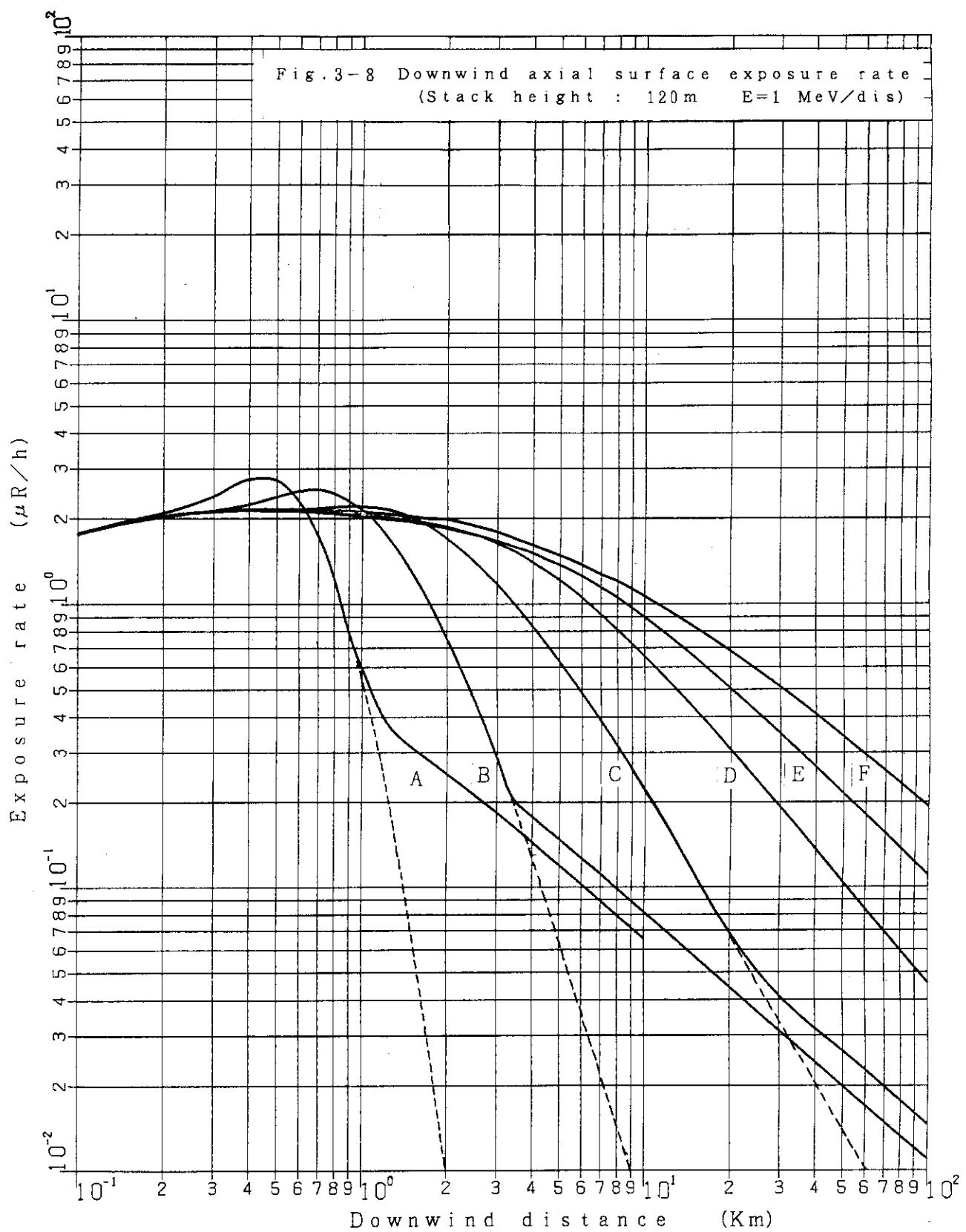


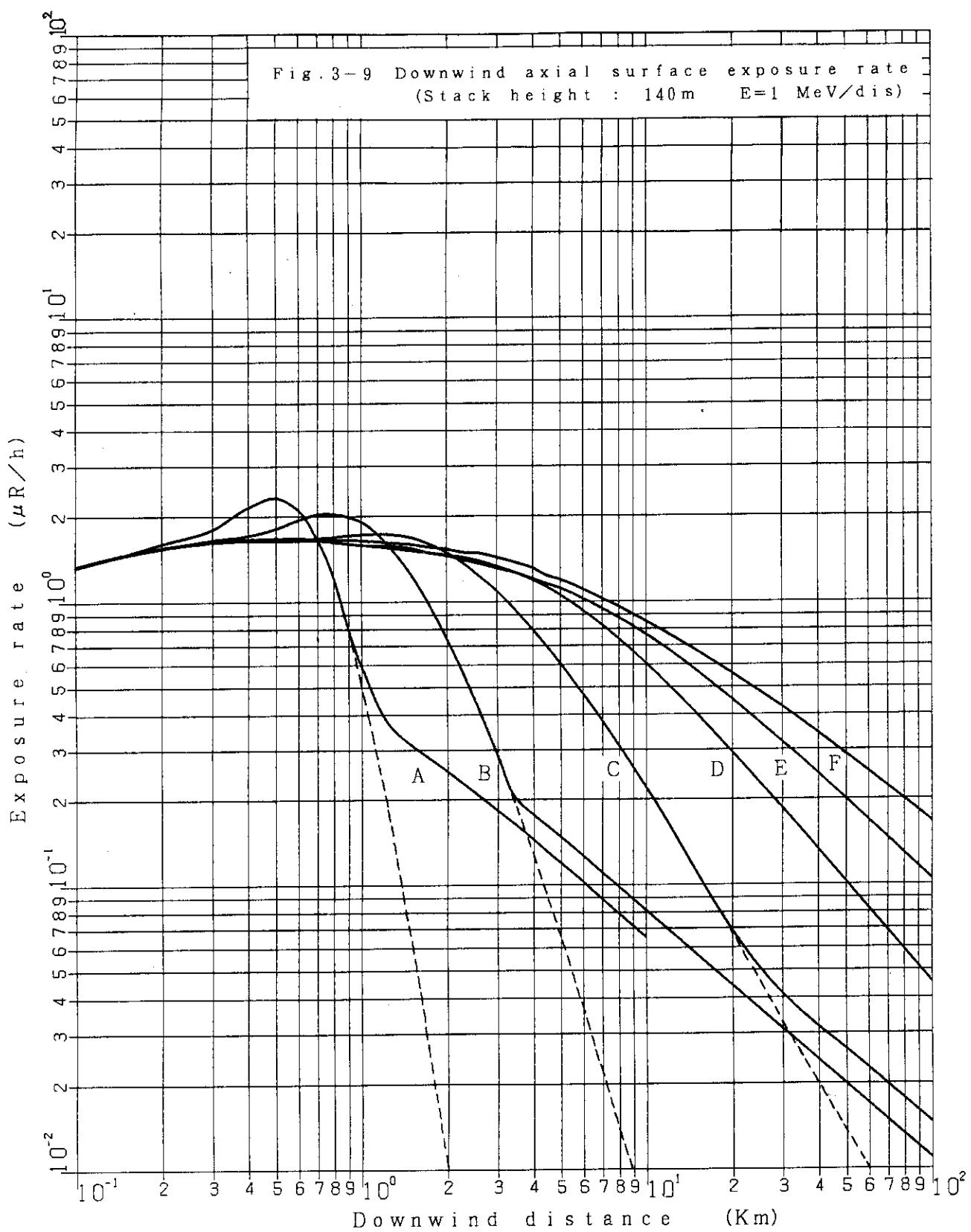


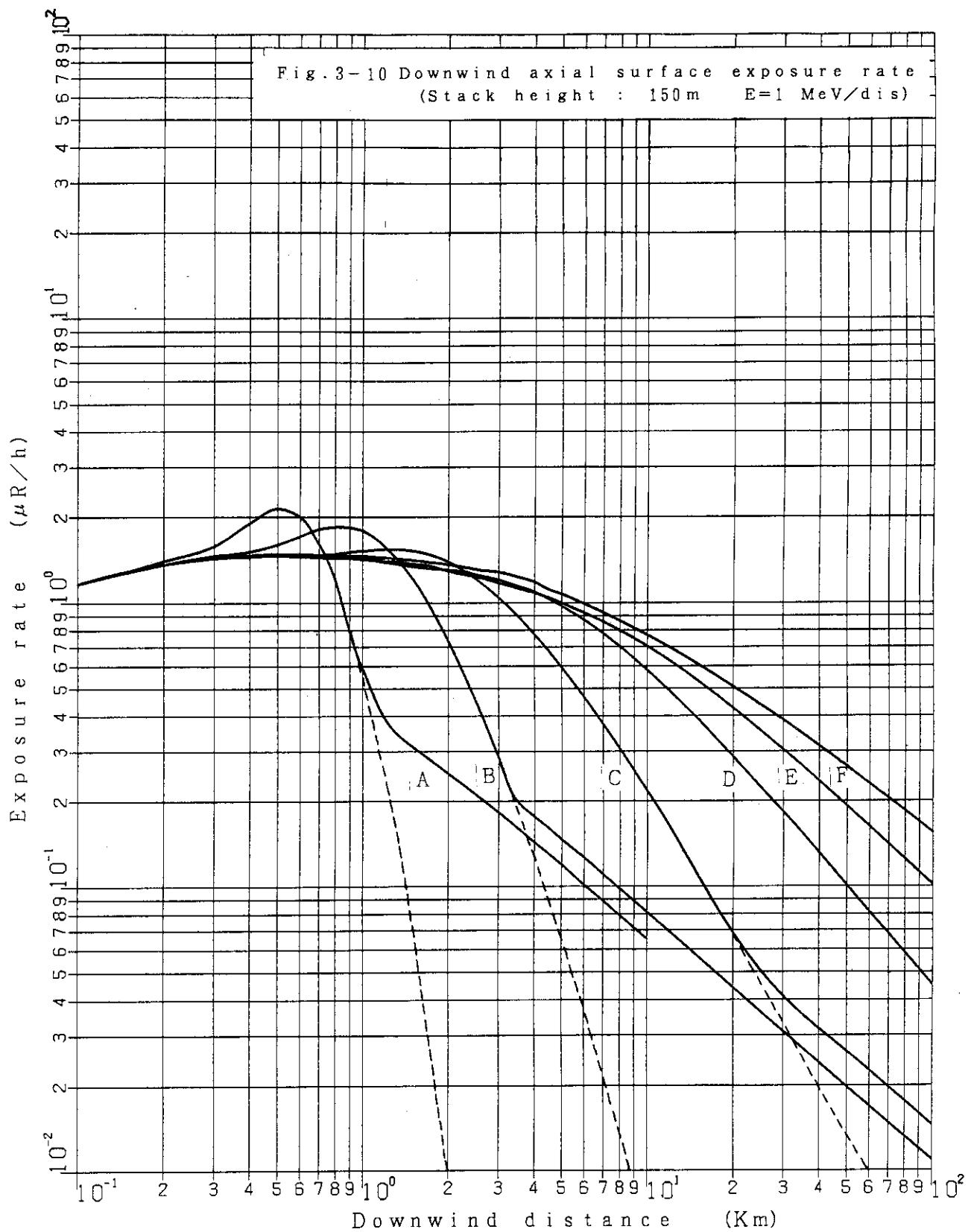


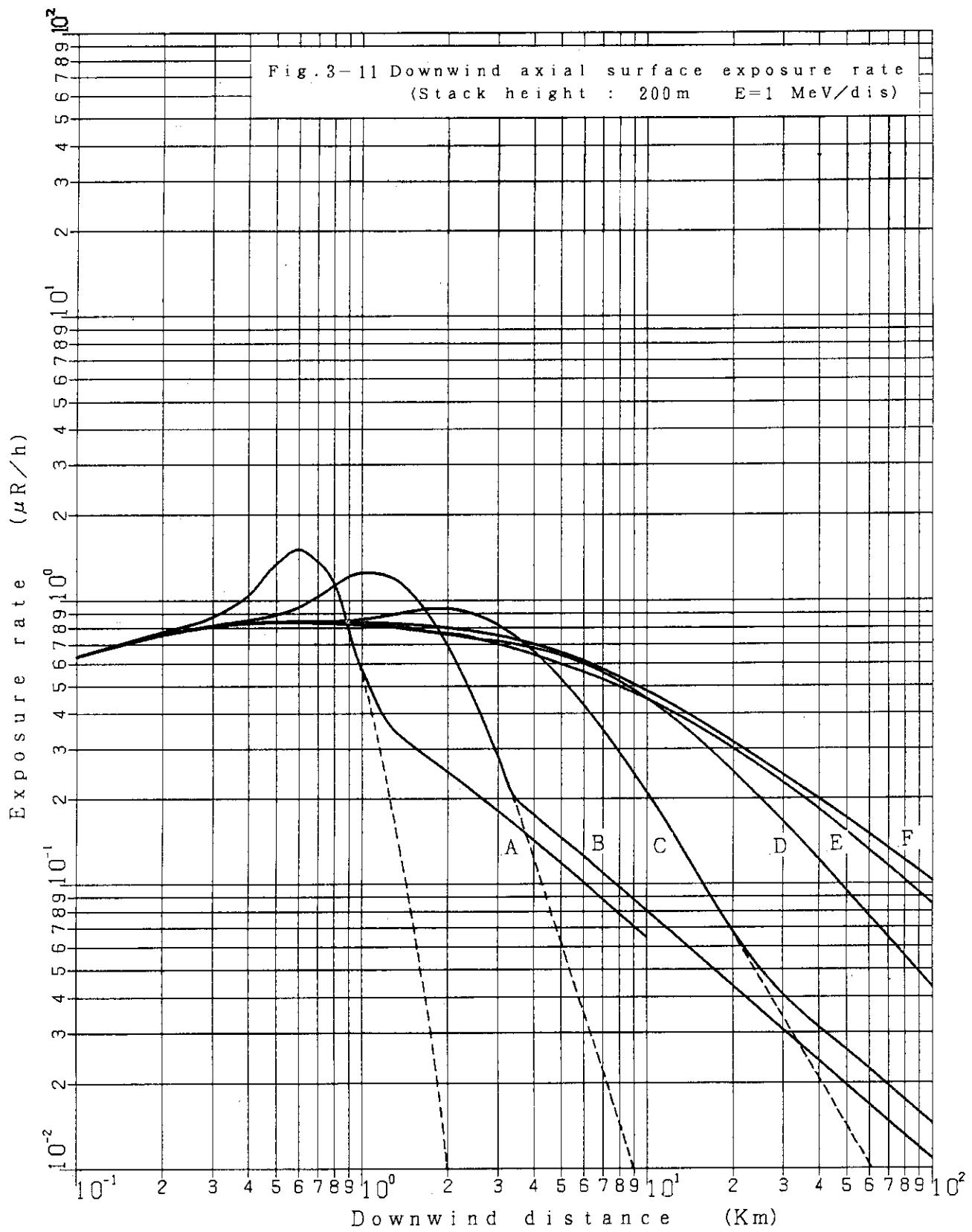












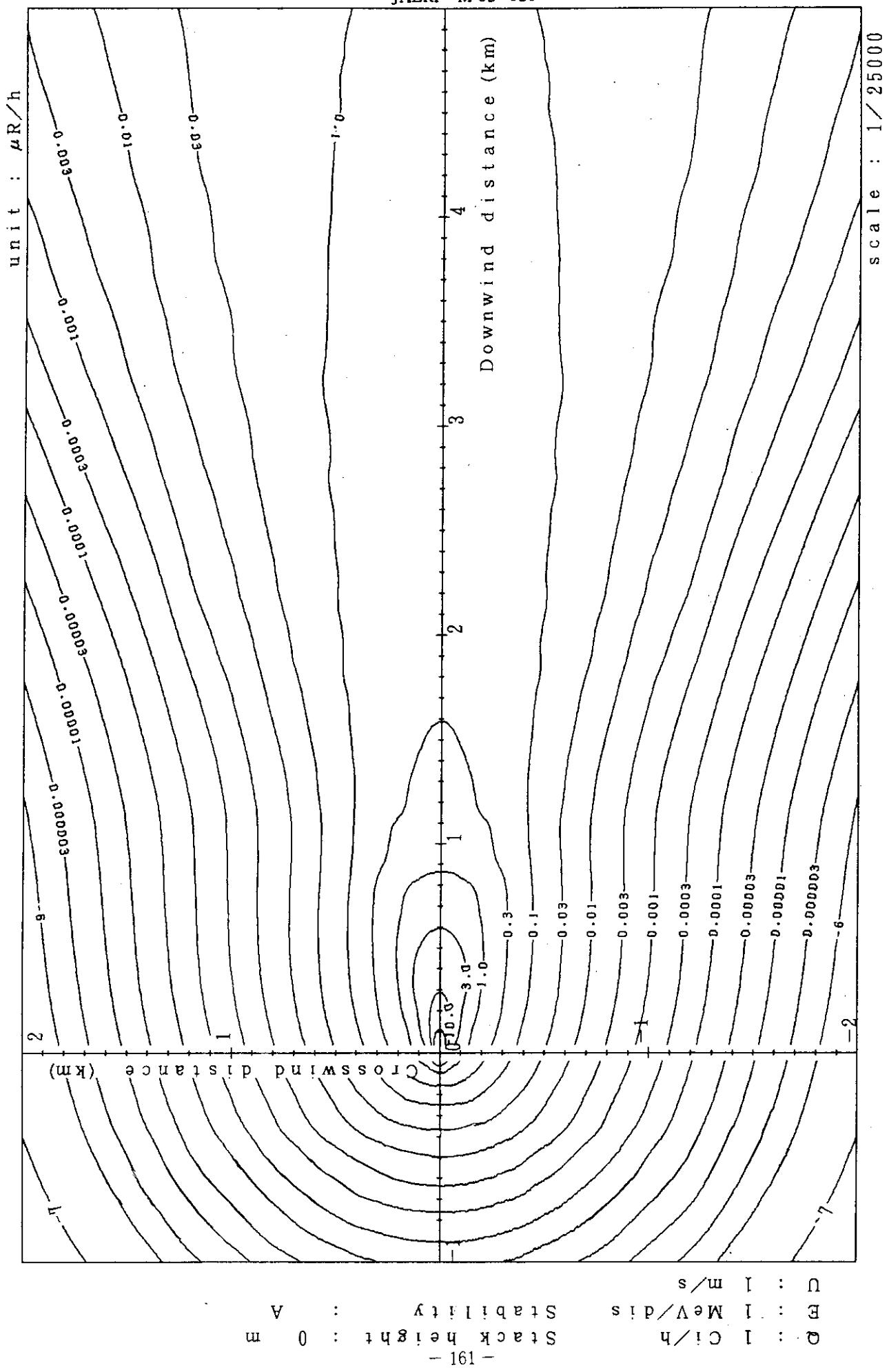


Fig. 4-1-1(A) Isopleths of surface exposure rate

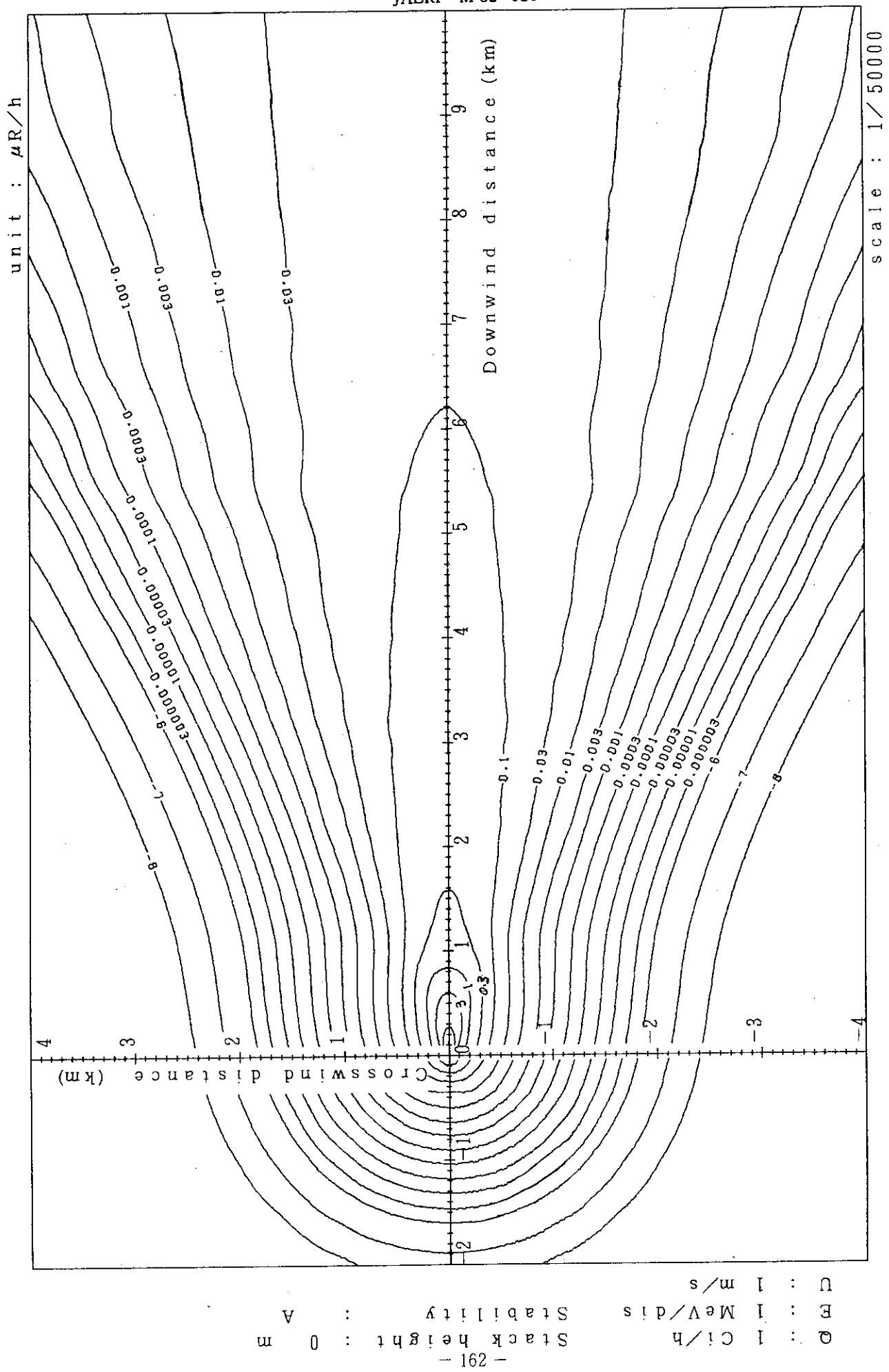


Fig. 4-1-1(B) Isopleths of surface exposure rate

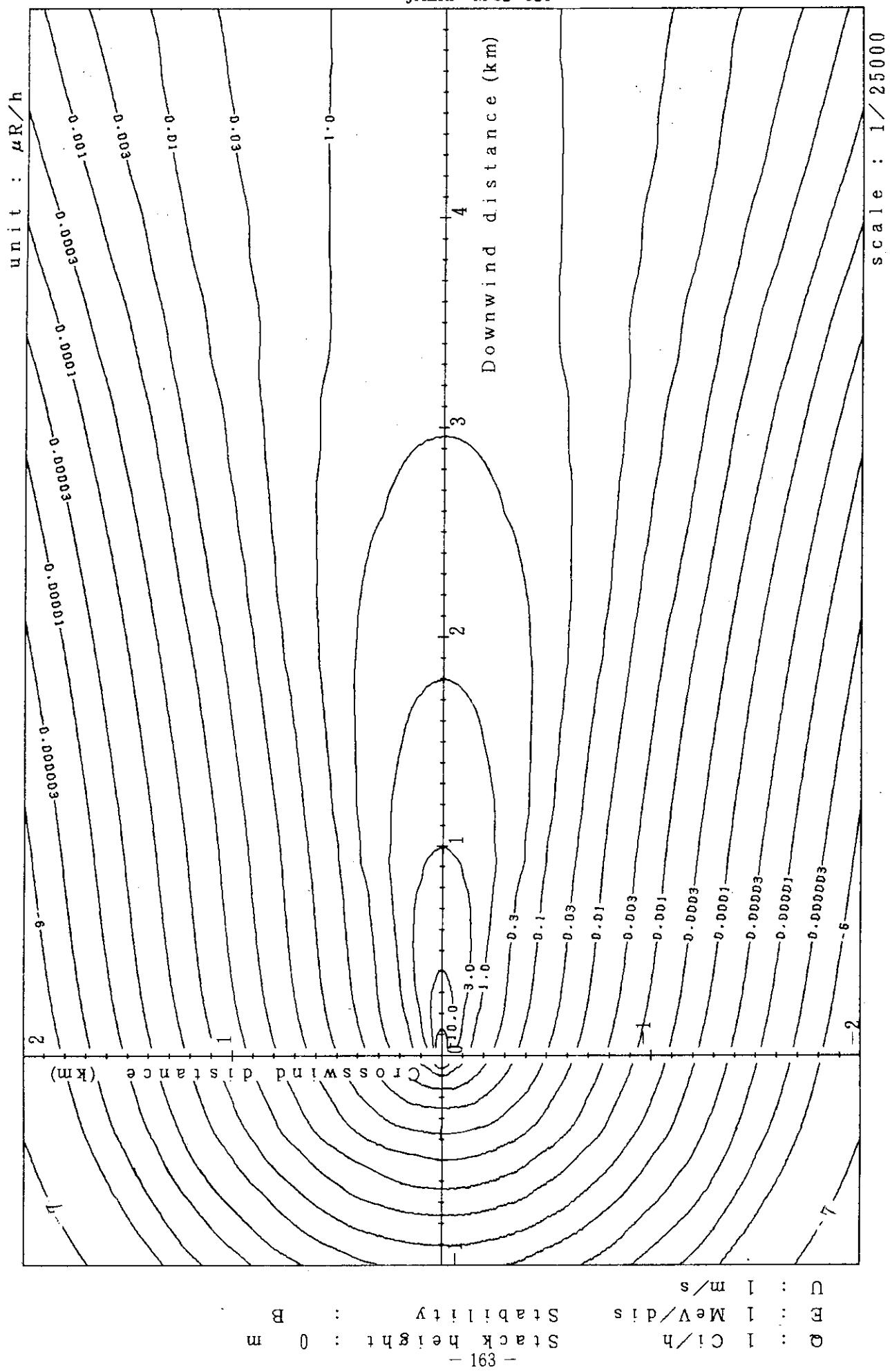


Fig. 4-1-2 (A) Isopleths of surface exposure rate

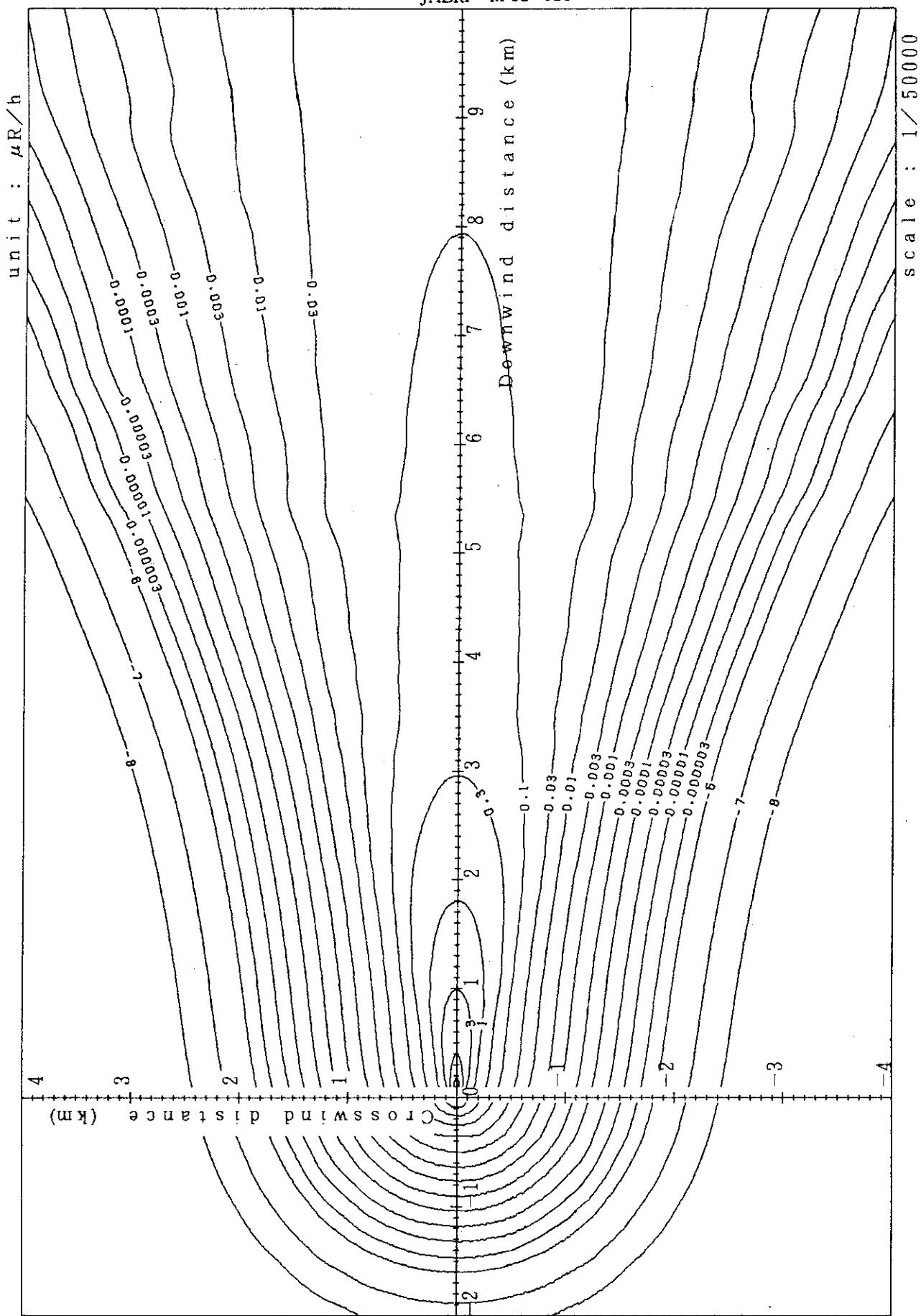


Fig. 4-1-2 (B) Isopleths of surface exposure rate

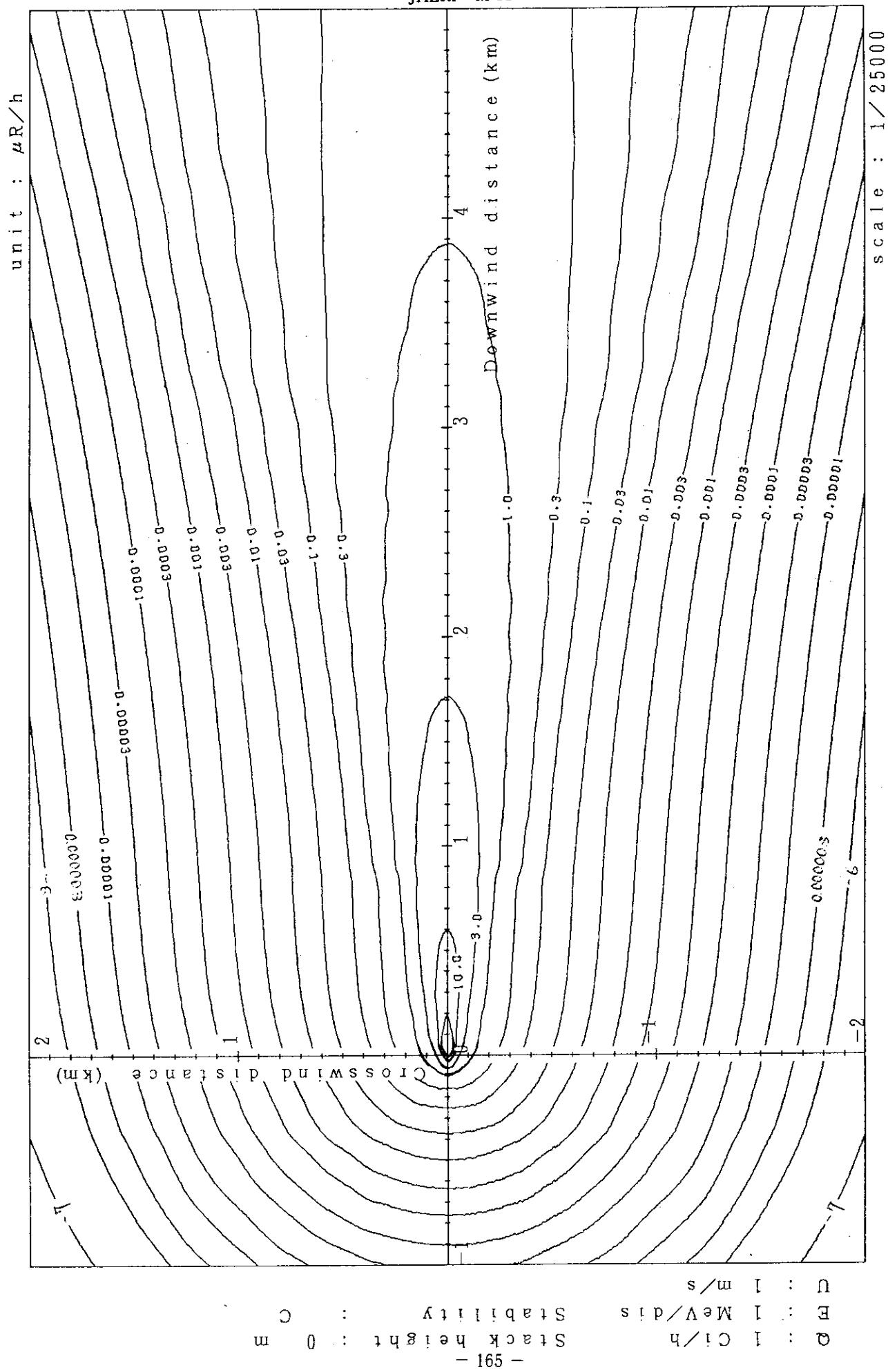


Fig. 4-1-3 (A) Isopleths of surface exposure rate

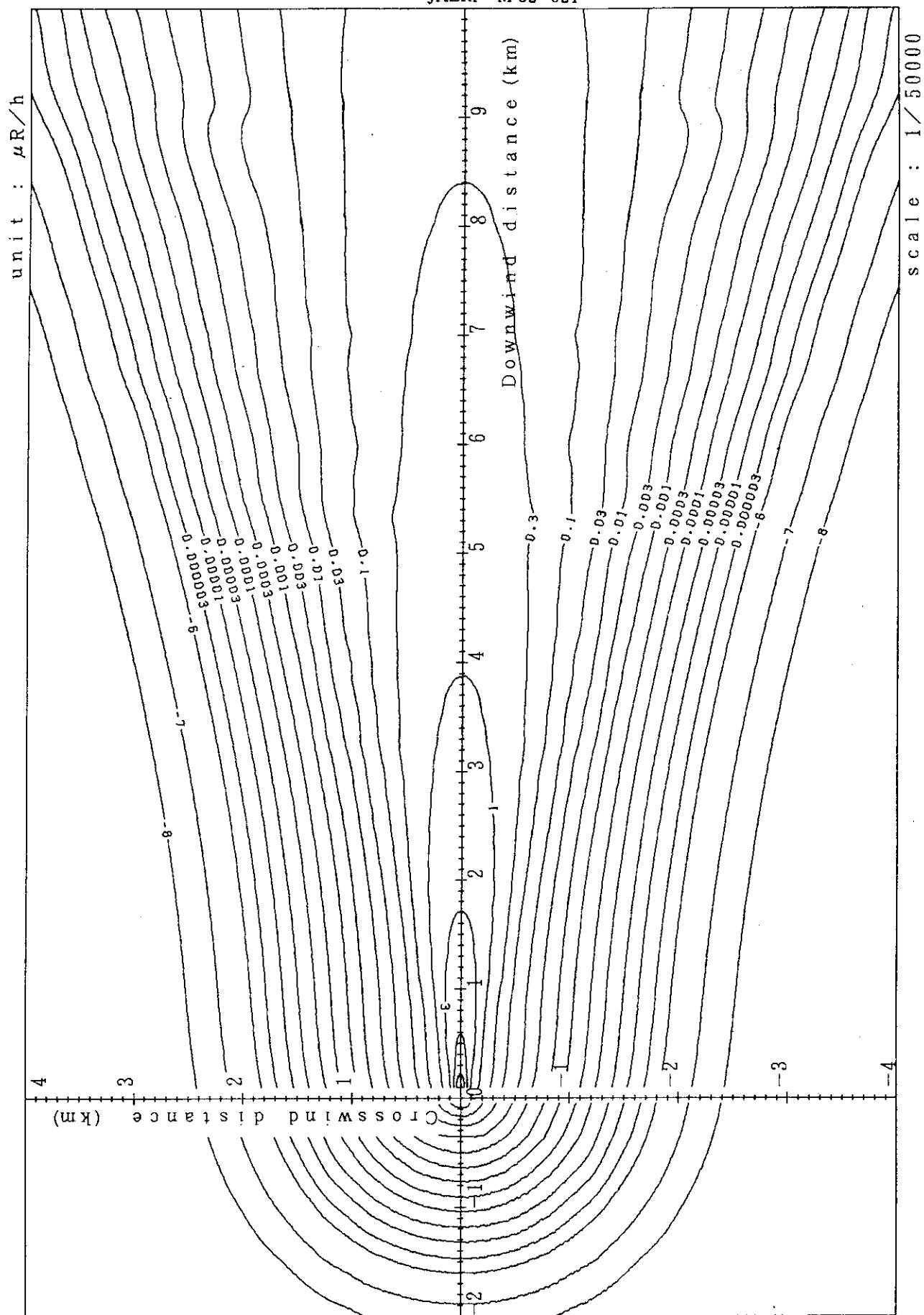


Fig. 4-1-3 (B) Isopleths of surface exposure rate

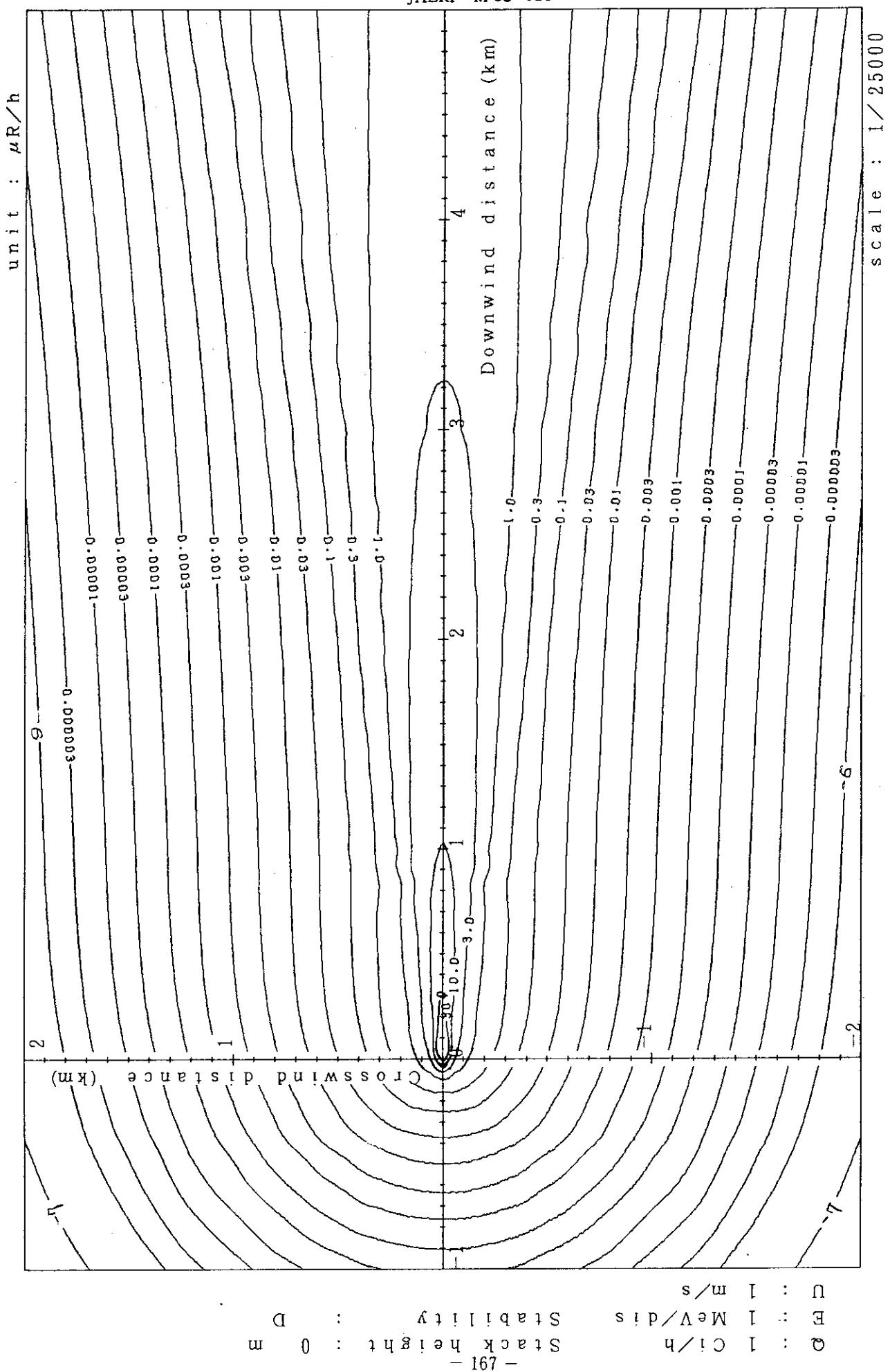


Fig. 4-1-4(A) Isopleths of surface exposure rate

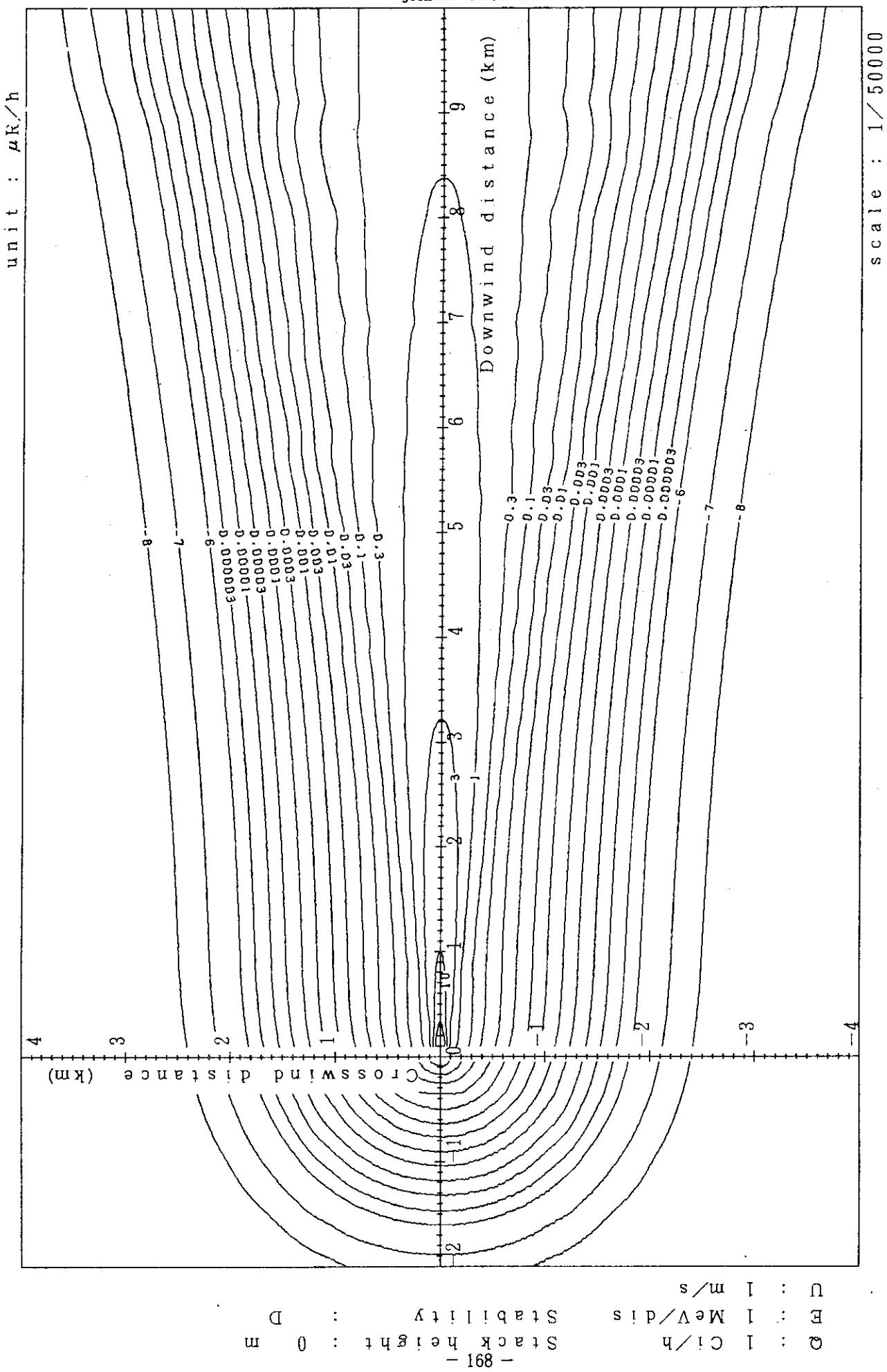


Fig. 4-1-4 (B) Isopleths of surface exposure rate

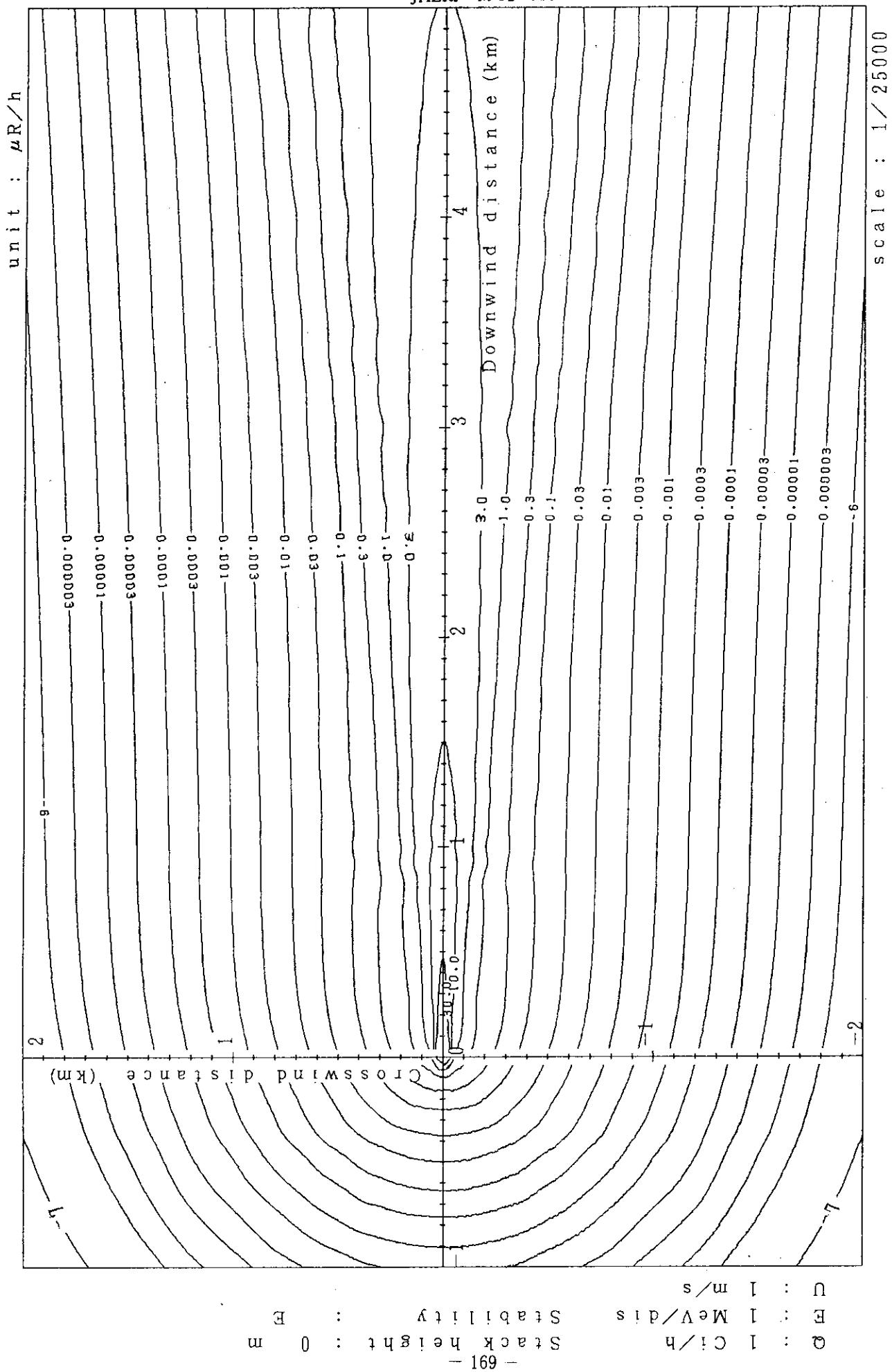


Fig. 4-1-5 (A) Isopleths of surface exposure rate

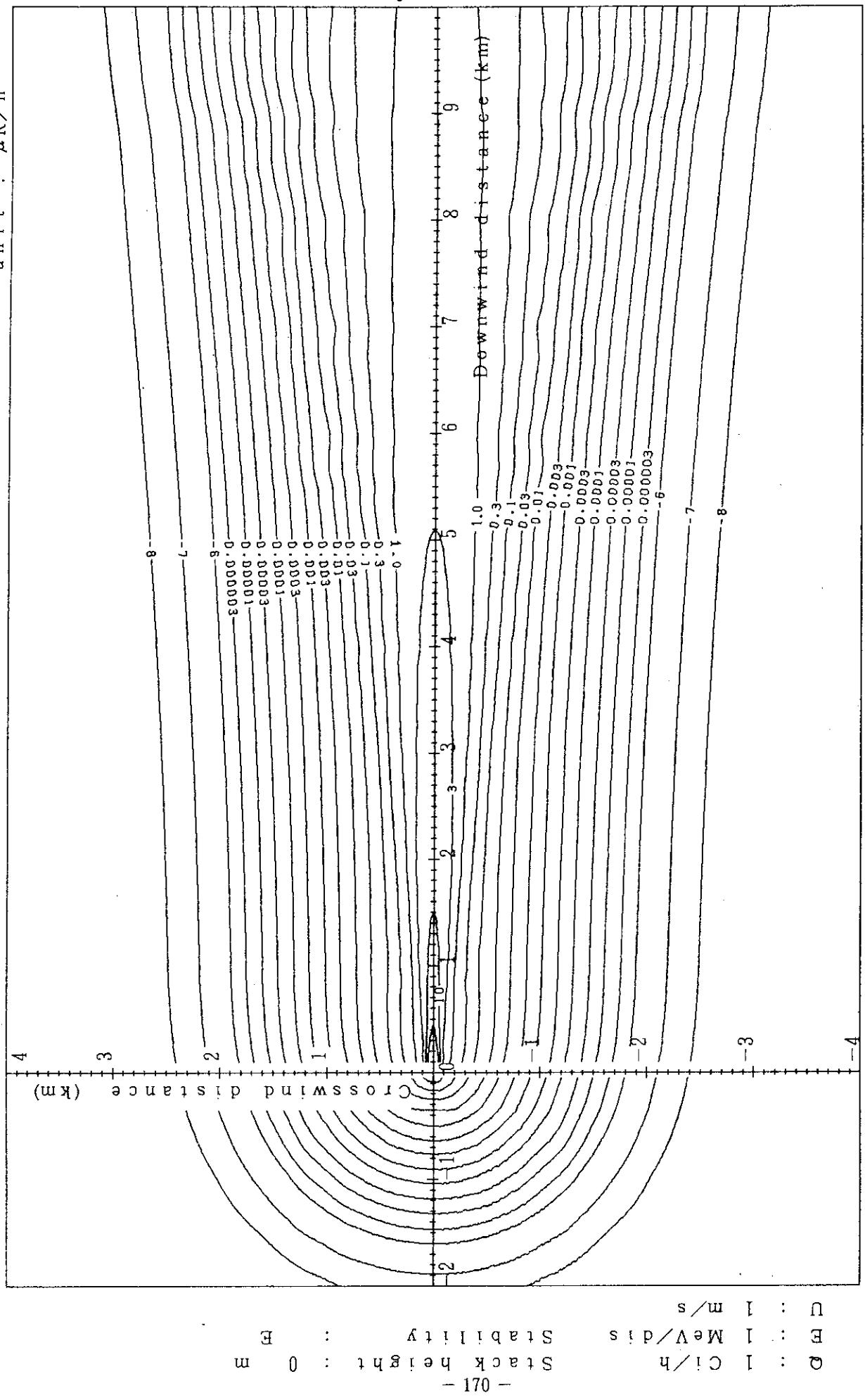
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-1-5 (B) Isopleths of surface exposure rate

scale : 1/50000

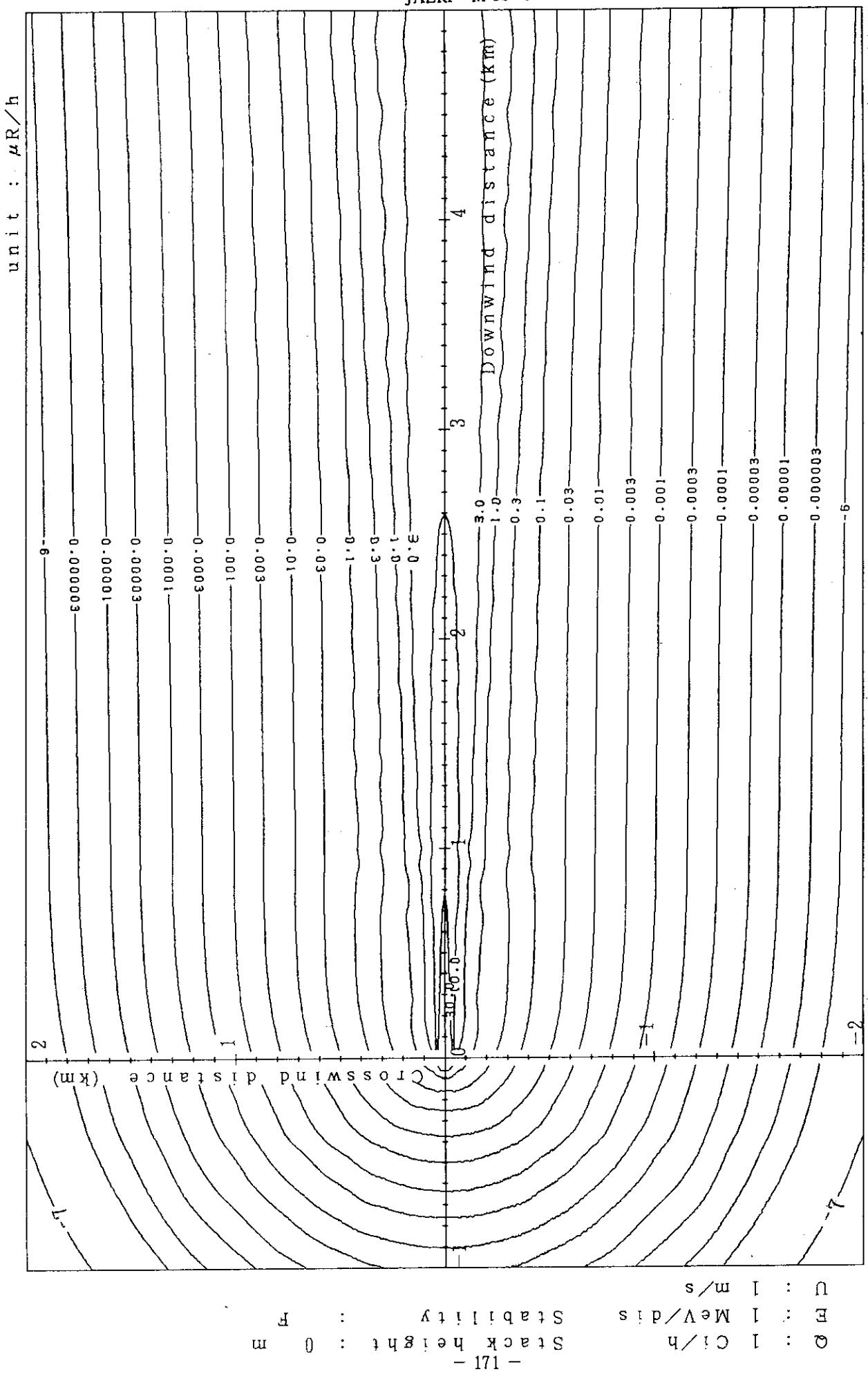


Fig. 4-1-6 (A) Isopleths of surface exposure rate

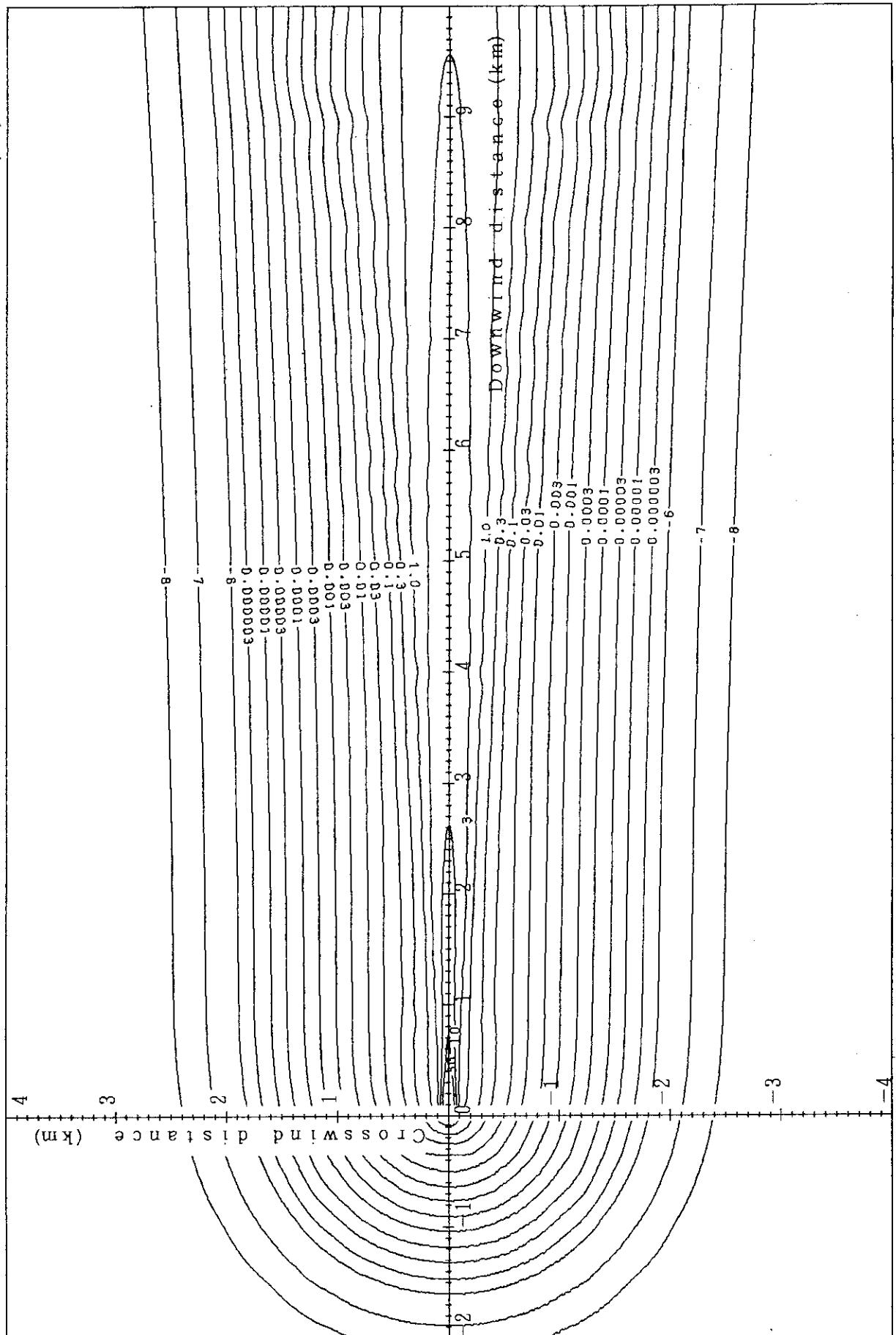
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-1-6 (B) Isopleths of surface exposure rate

- 172 -

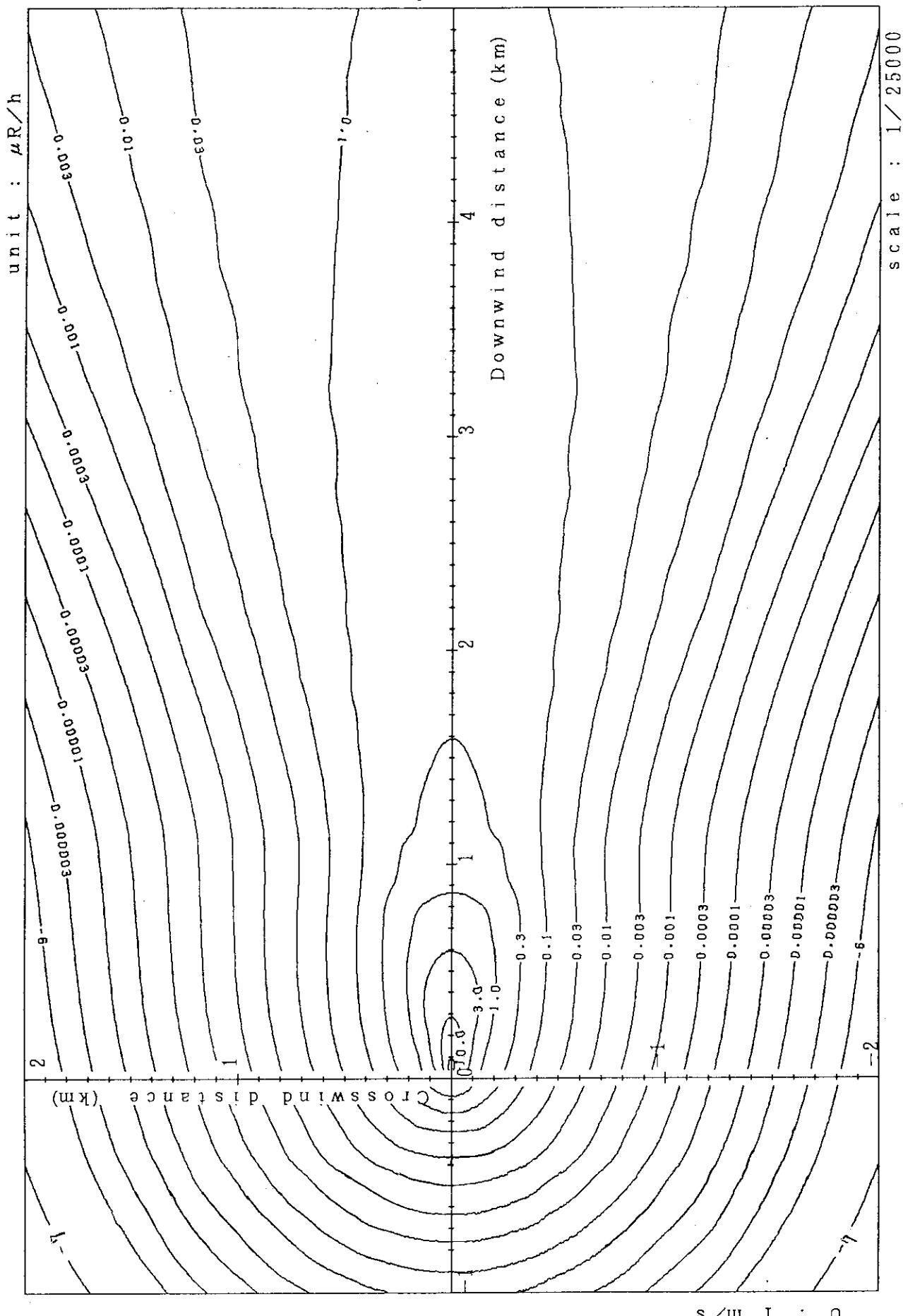


Fig. 4-2-1 (A) Isopleths of surface exposure rate

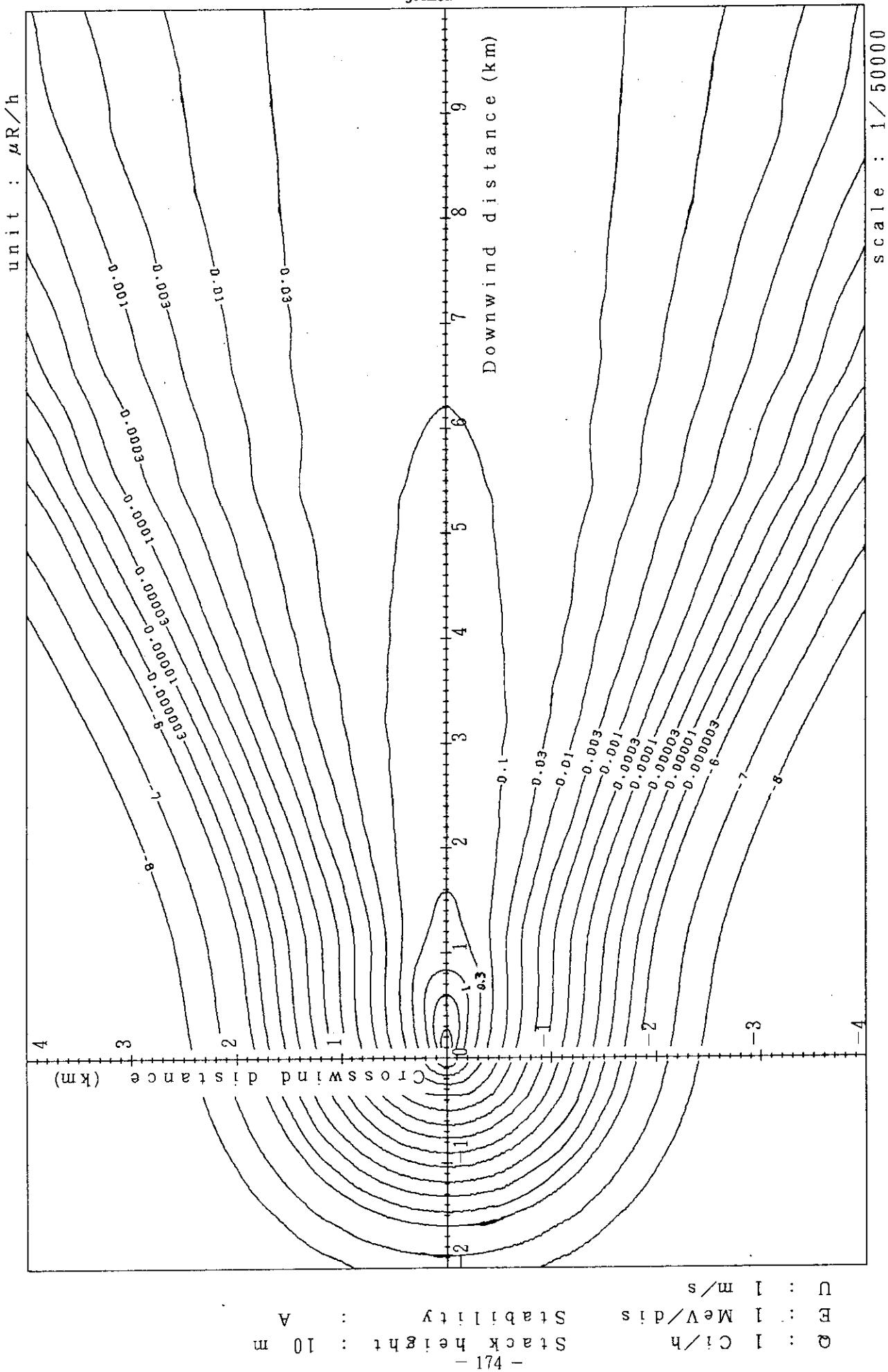


Fig. 4-2-1(B) Isopleths of surface exposure rate

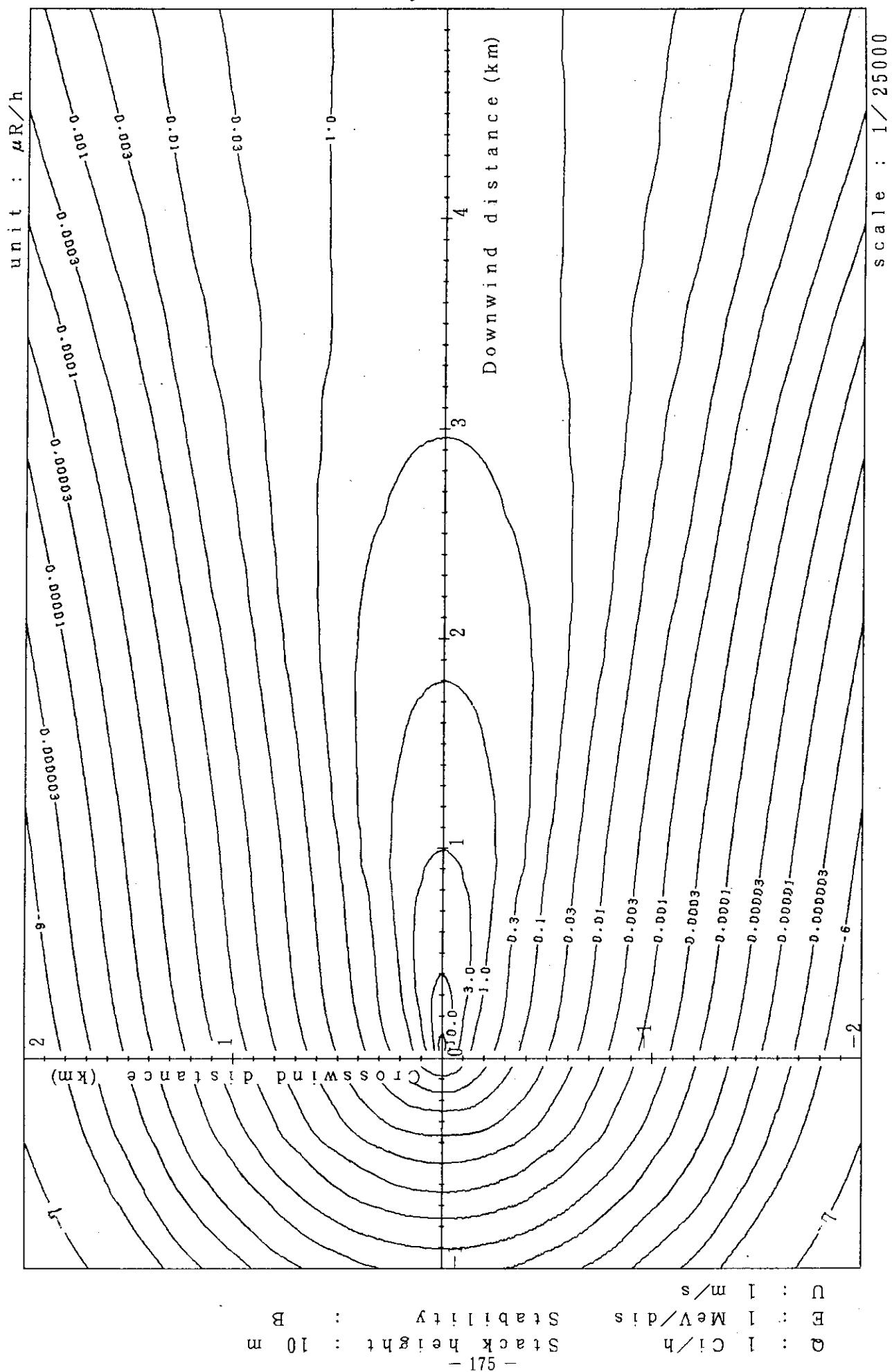


Fig. 4-2-2 (A) Isopleths of surface exposure rate

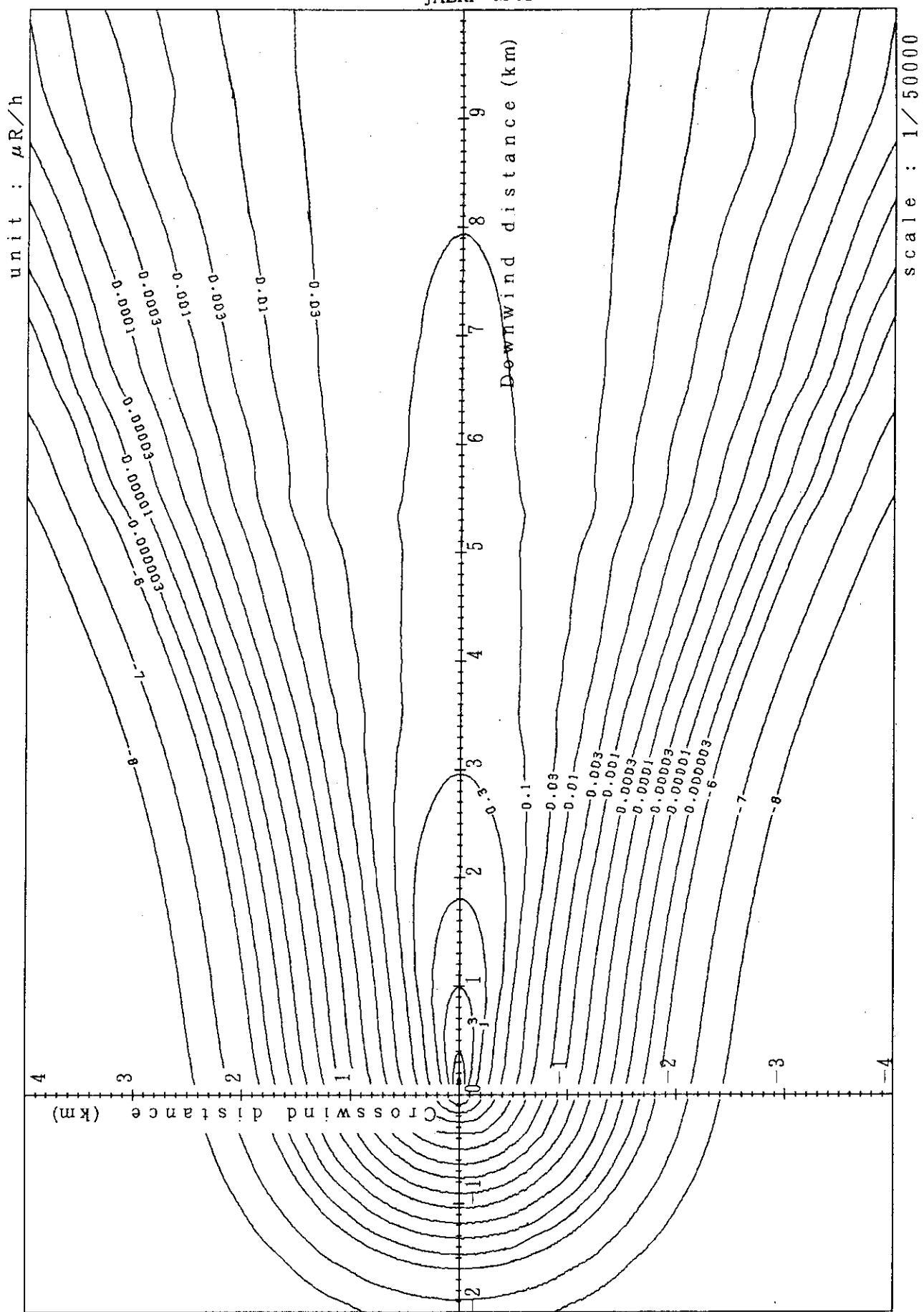


Fig. 4-2-2 (B) Isopleths of surface exposure rate

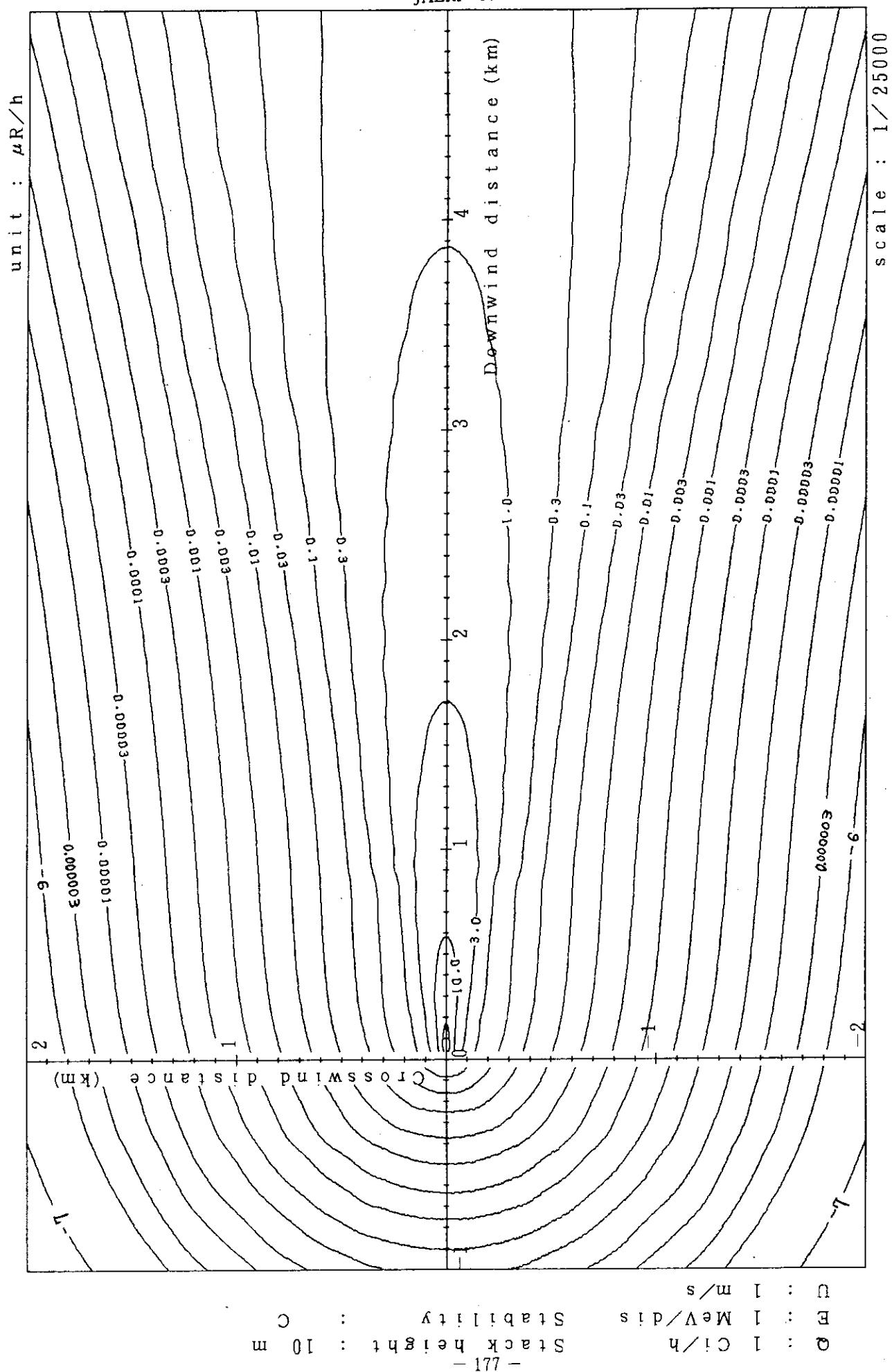


Fig. 4-2-3(A) Isopleths of surface exposure rate

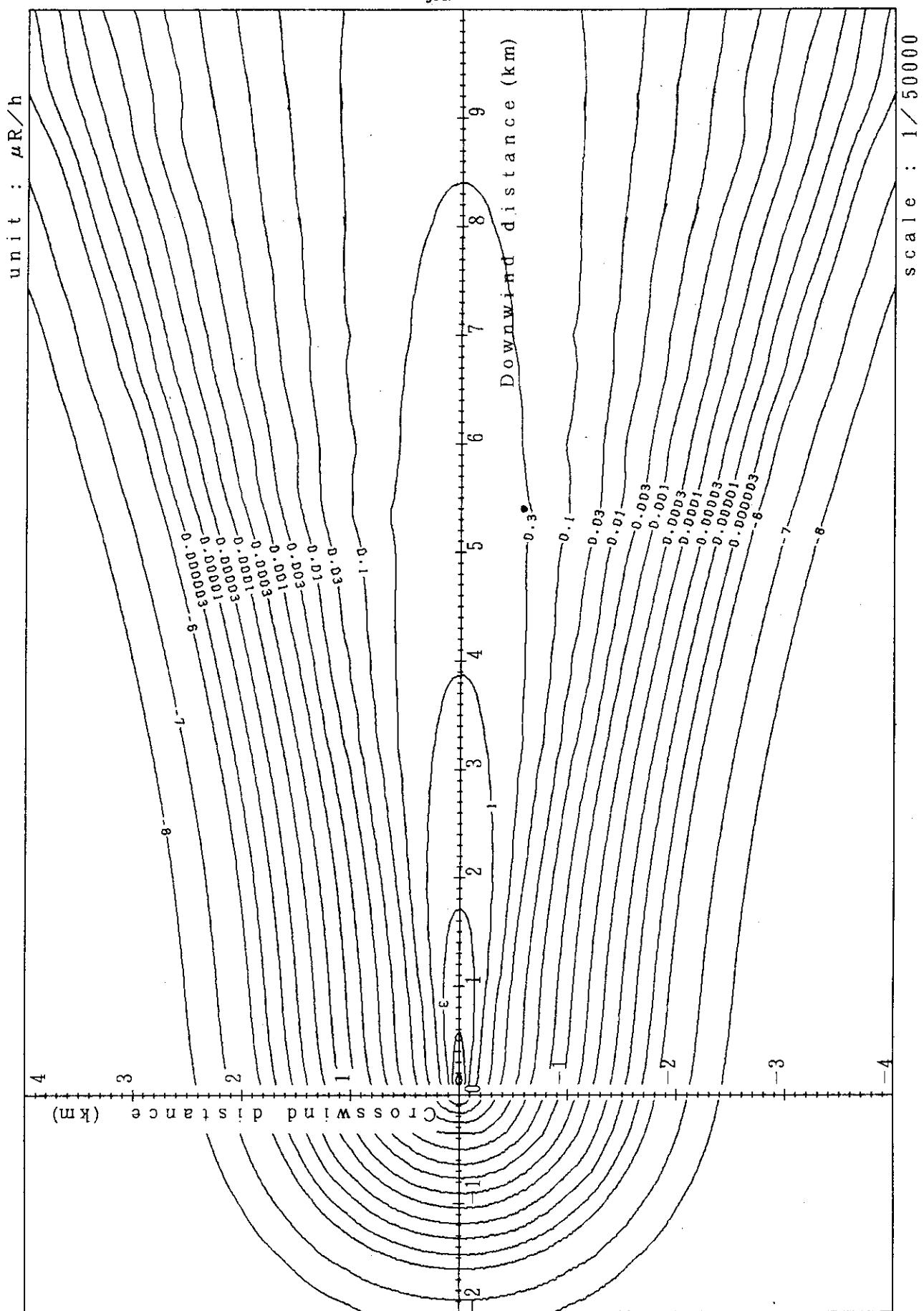


Fig. 4-2-3(B) Isopleths of surface exposure rate

GE : 1 Ci/h      Stack height : 10 m      Stability : C  
 GE : 1 MeV/di      Stack height : 10 m      C

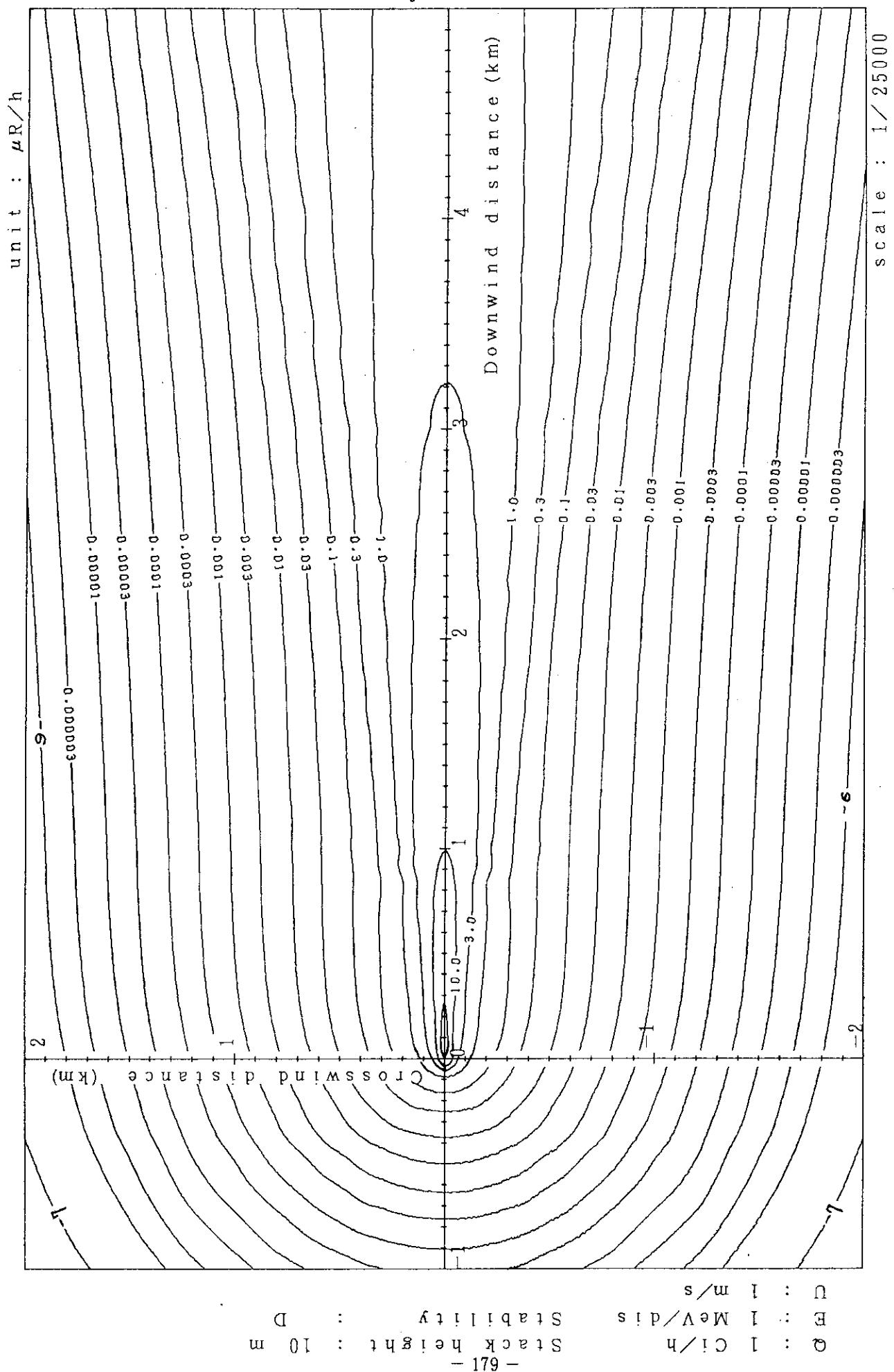
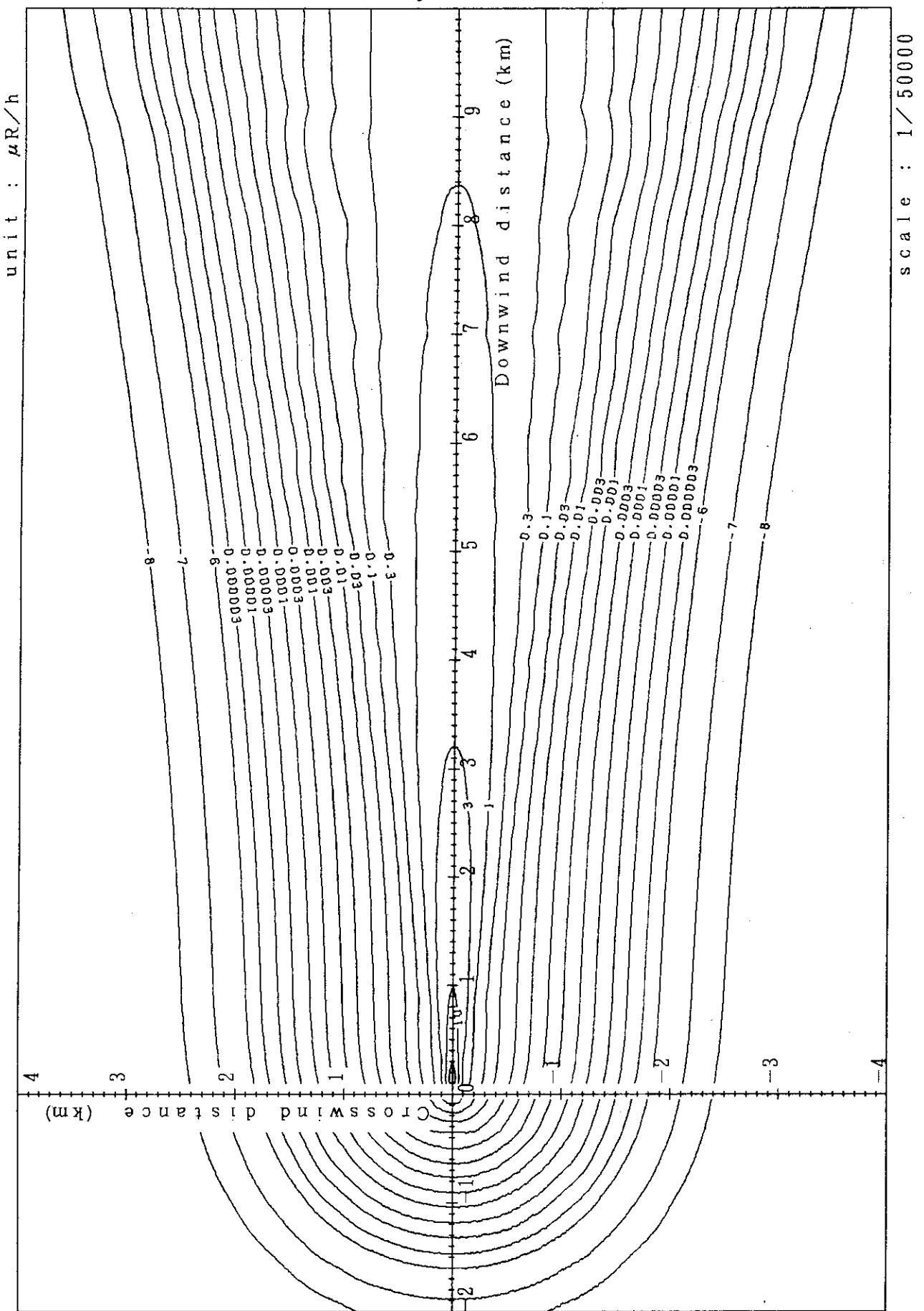


Fig. 4-2-4 (A) Isopleths of surface exposure rate

scale : 1/25000



CD : 1 Ci/h      SH : 10 m  
 CH : 1 MeV/d<sub>is</sub>      Stabili ty : D  
 -180 -

Fig. 4-2-4(B) Isopleths of surface exposure rate

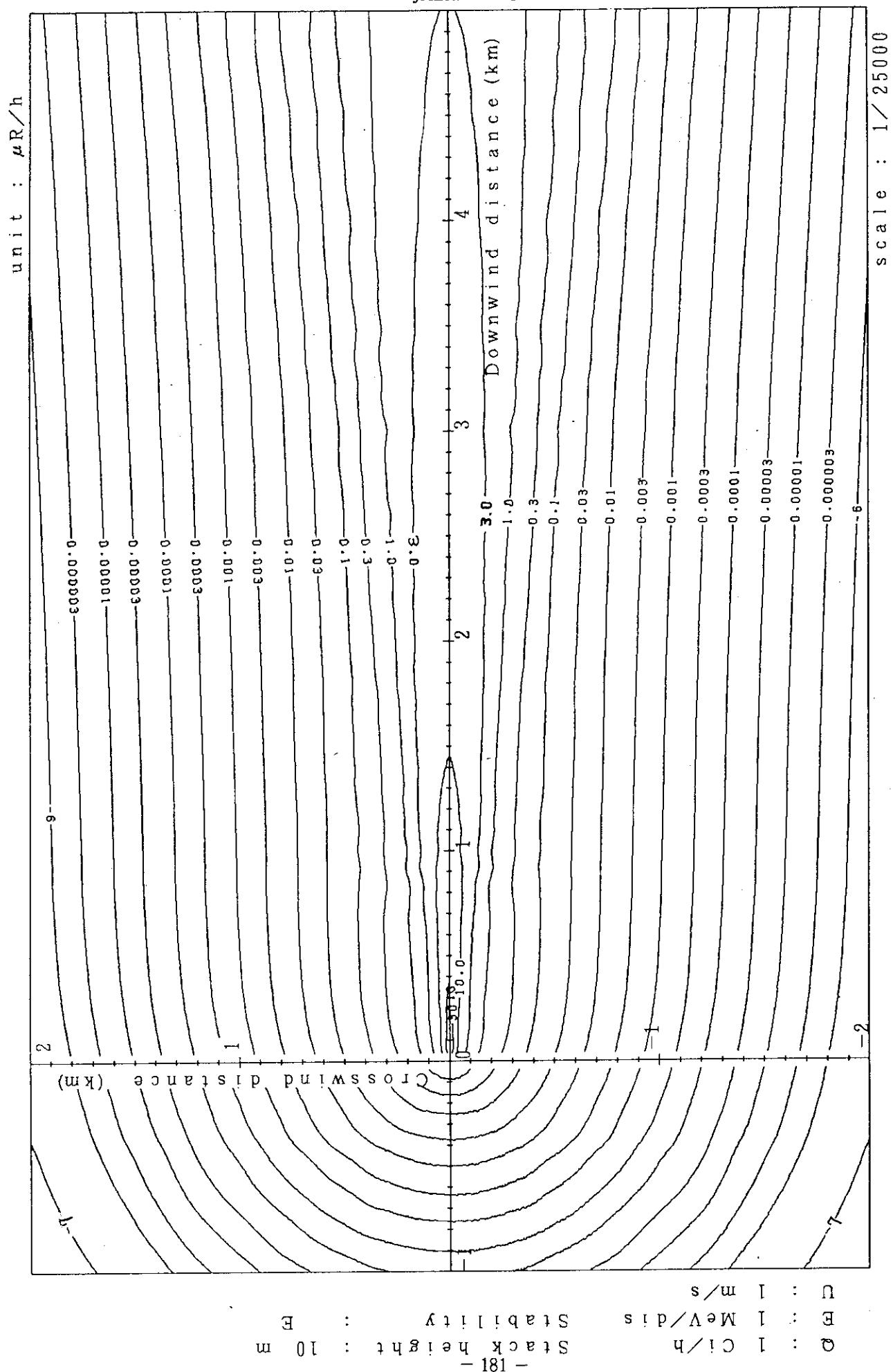


Fig. 4-2-5 (A) Isopleths of surface exposure rate

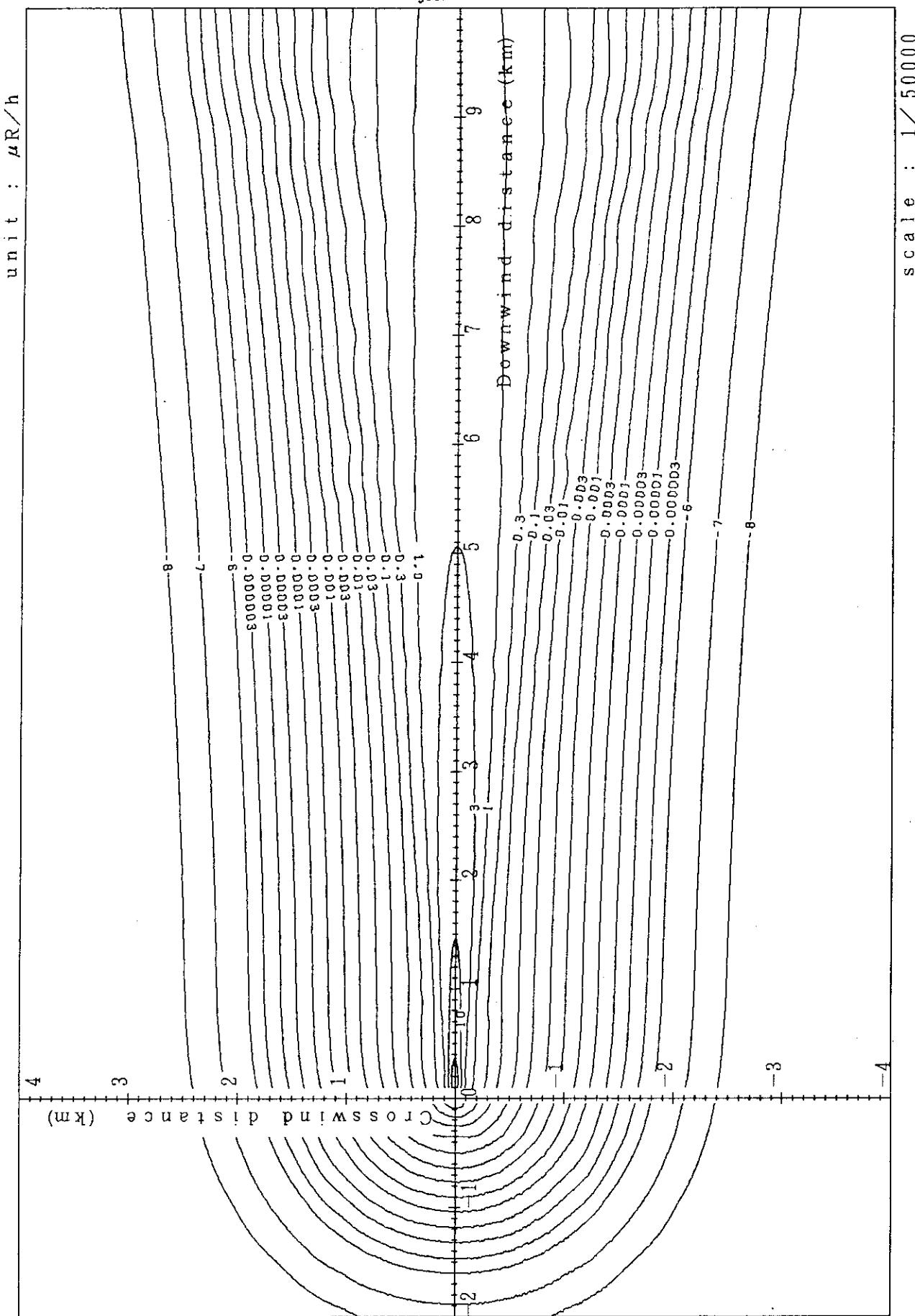


Fig. 4-2-5 (B) Isopleths of surface exposure rate

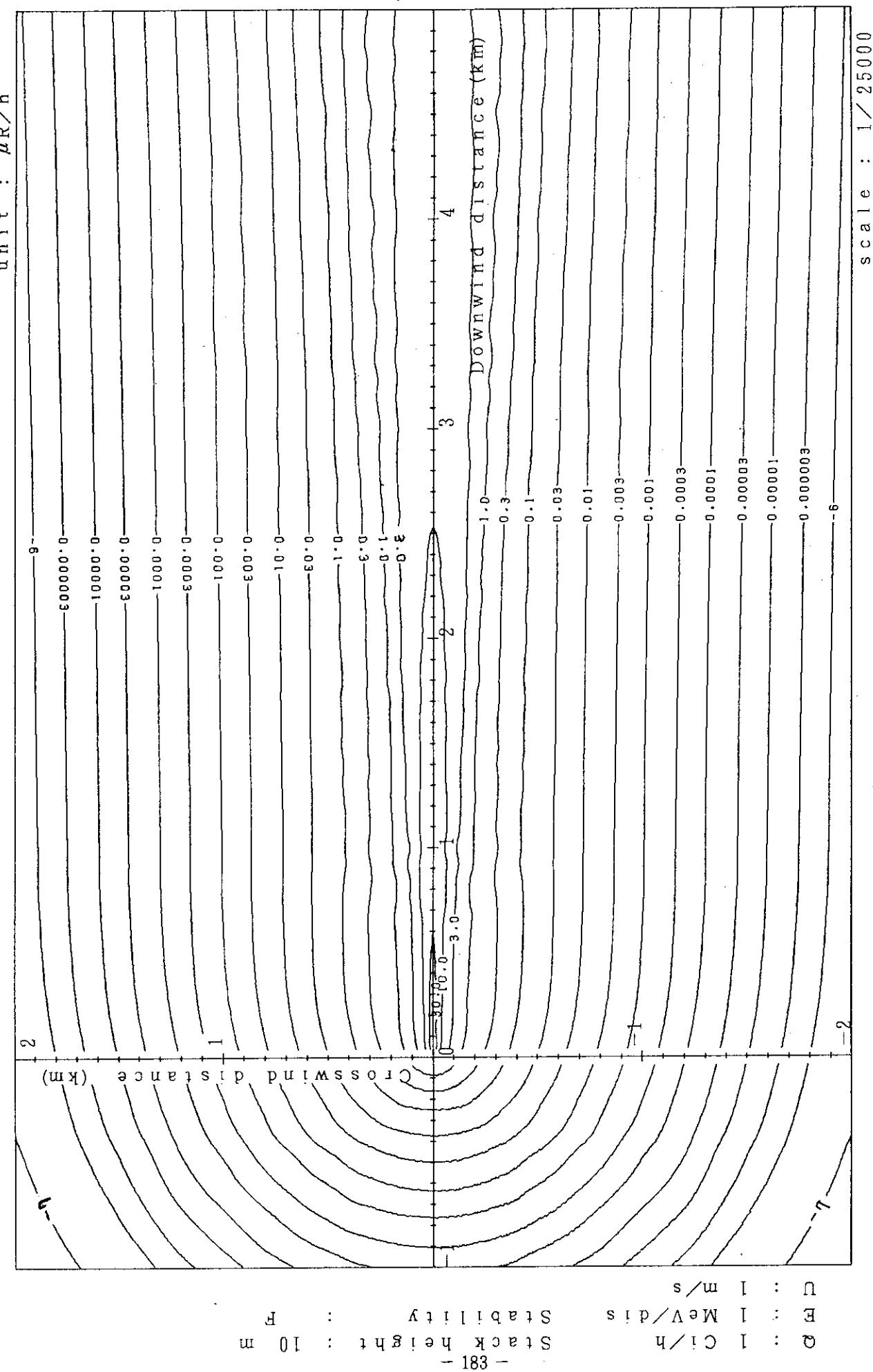


Fig. 4-2-6 (A) Isopleths of surface exposure rate

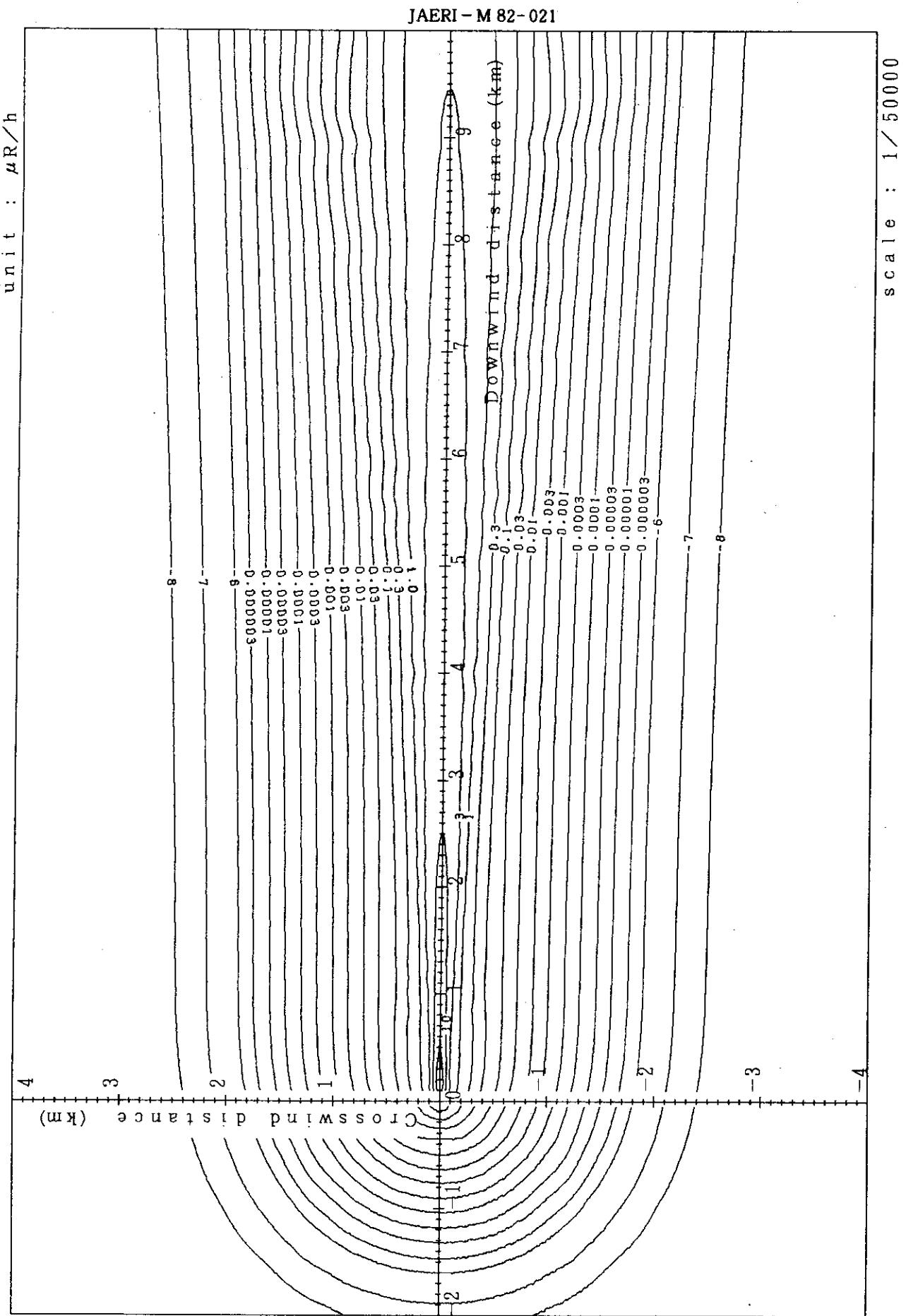


Fig. 4-2-6 (B) Isopleths of surface exposure rate

Q E : 1 Ci/h      S t a b i l i t y : 10 m  
 Q E : 1 MeV/di s      S t a b i l i t y : 10 m  
 Q E : 1 m/s

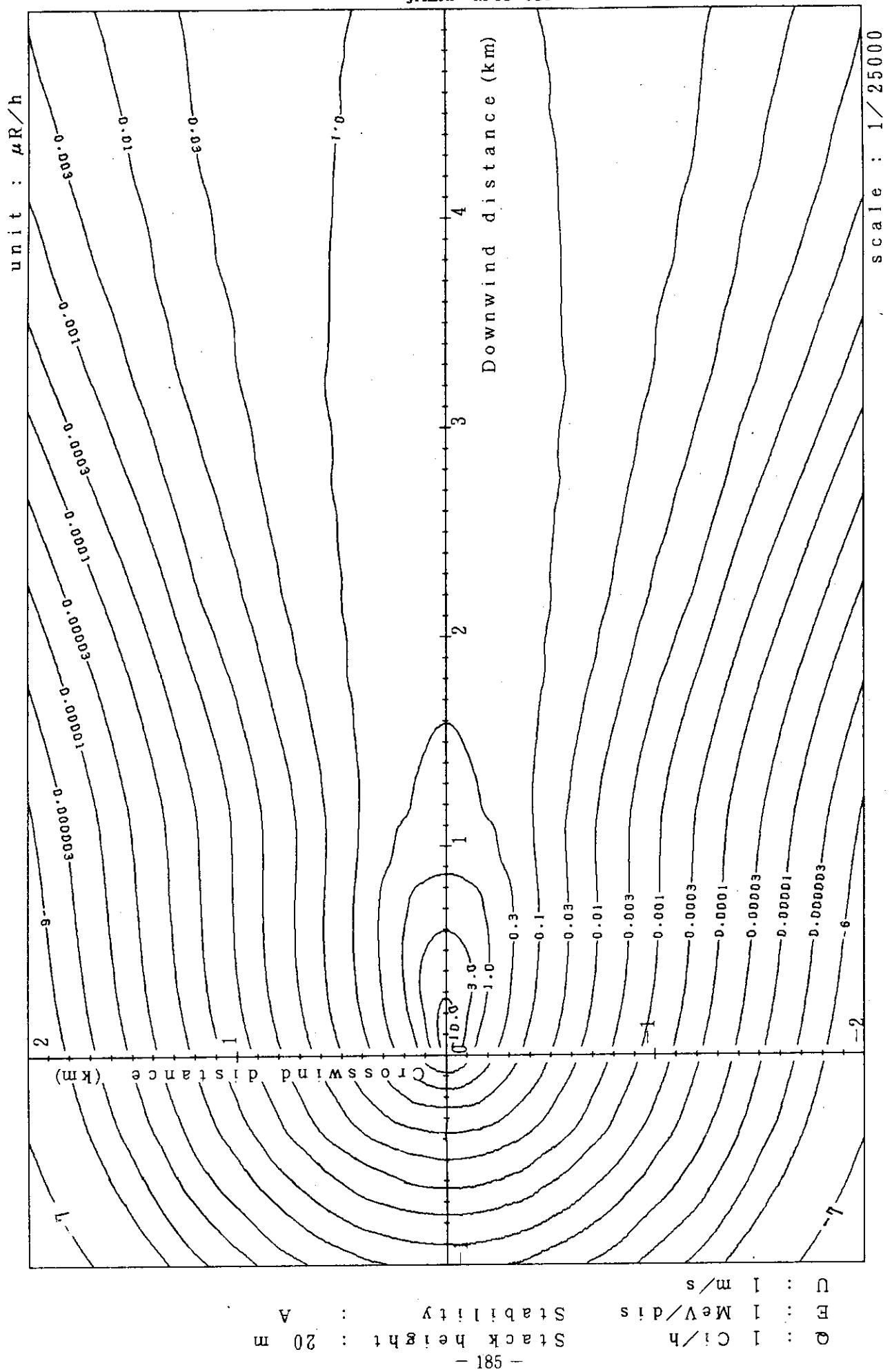


Fig. 4-3-1(A) Isopleths of surface exposure rate

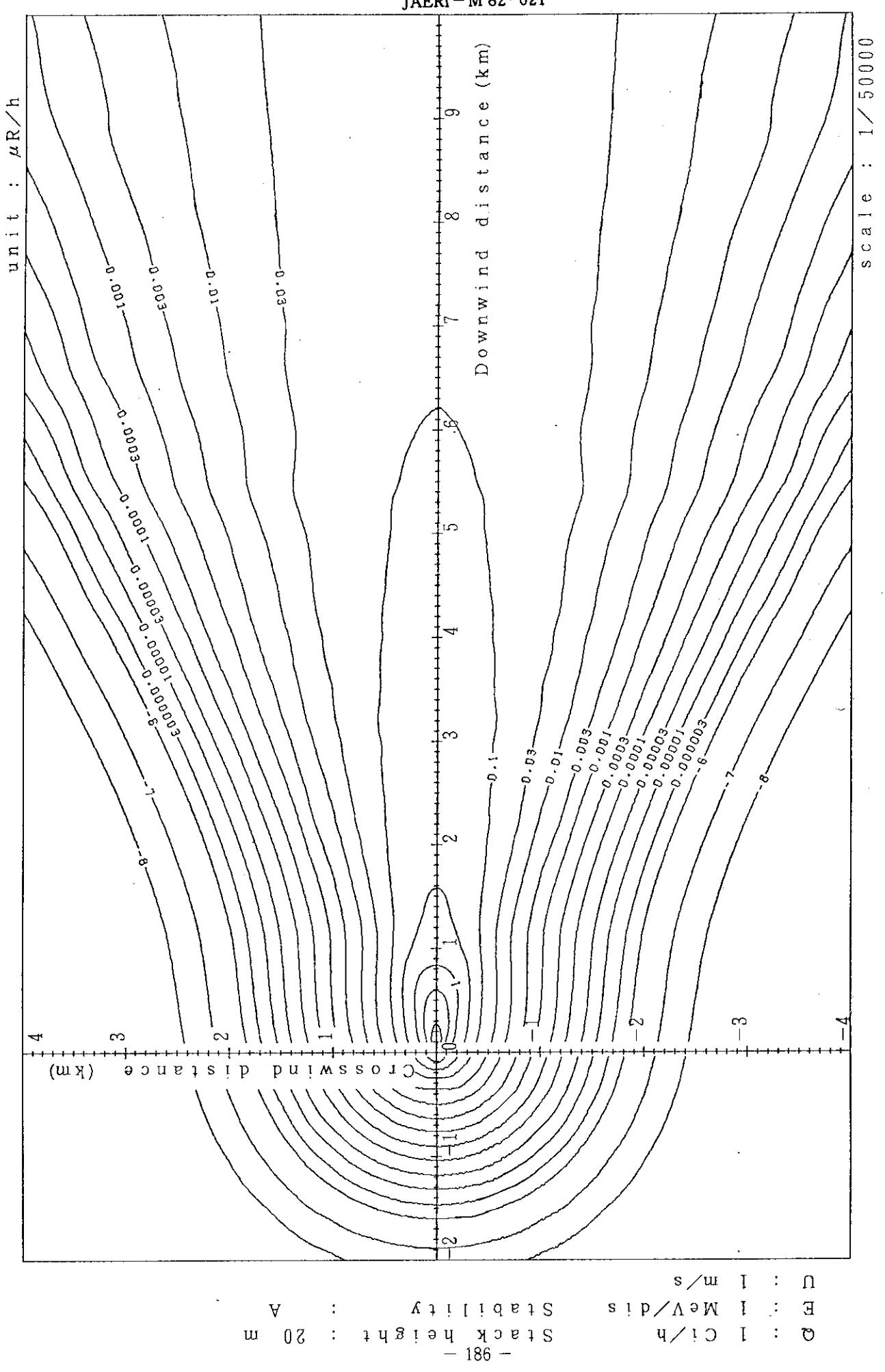


Fig. 4-3-1(B) Isopleths of surface exposure rate

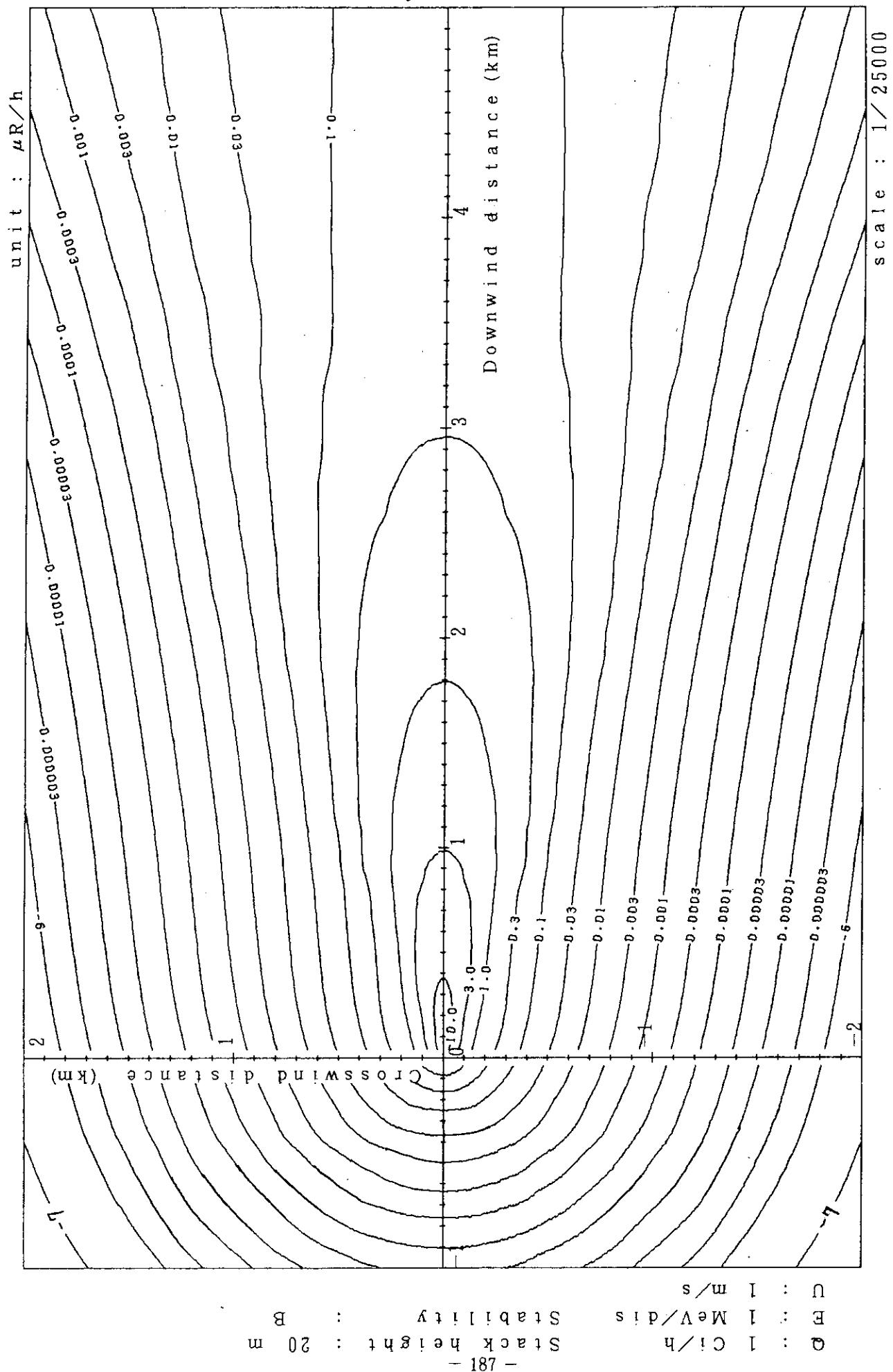
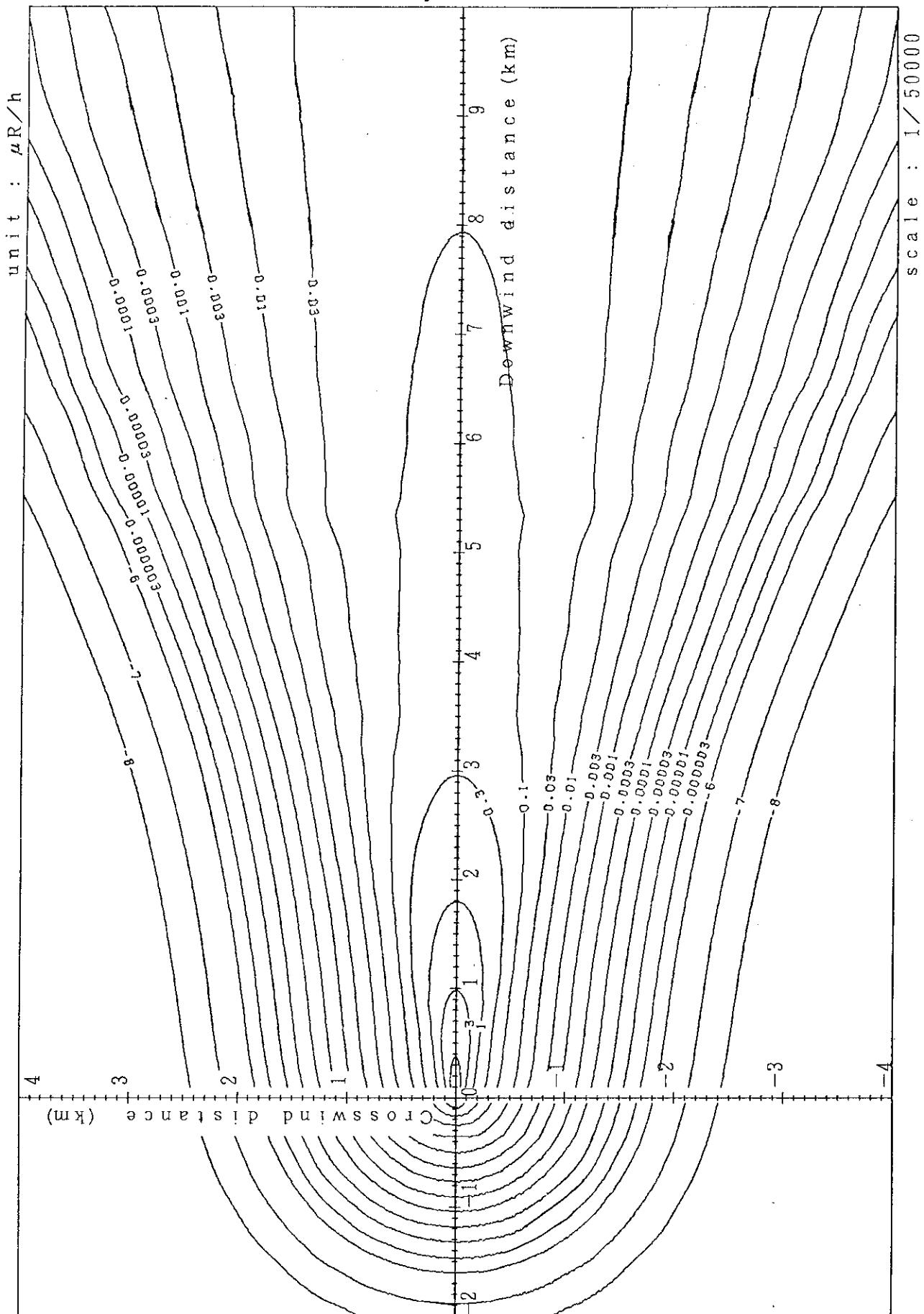


Fig. 4-3-2 (A) Isopleths of surface exposure rate



CD : 1 MeV/di  
 CD : 1 Ci/h Stabili ty : 20 m  
 CD : 1 Ci/h Stack height : 20 m  
 -188-

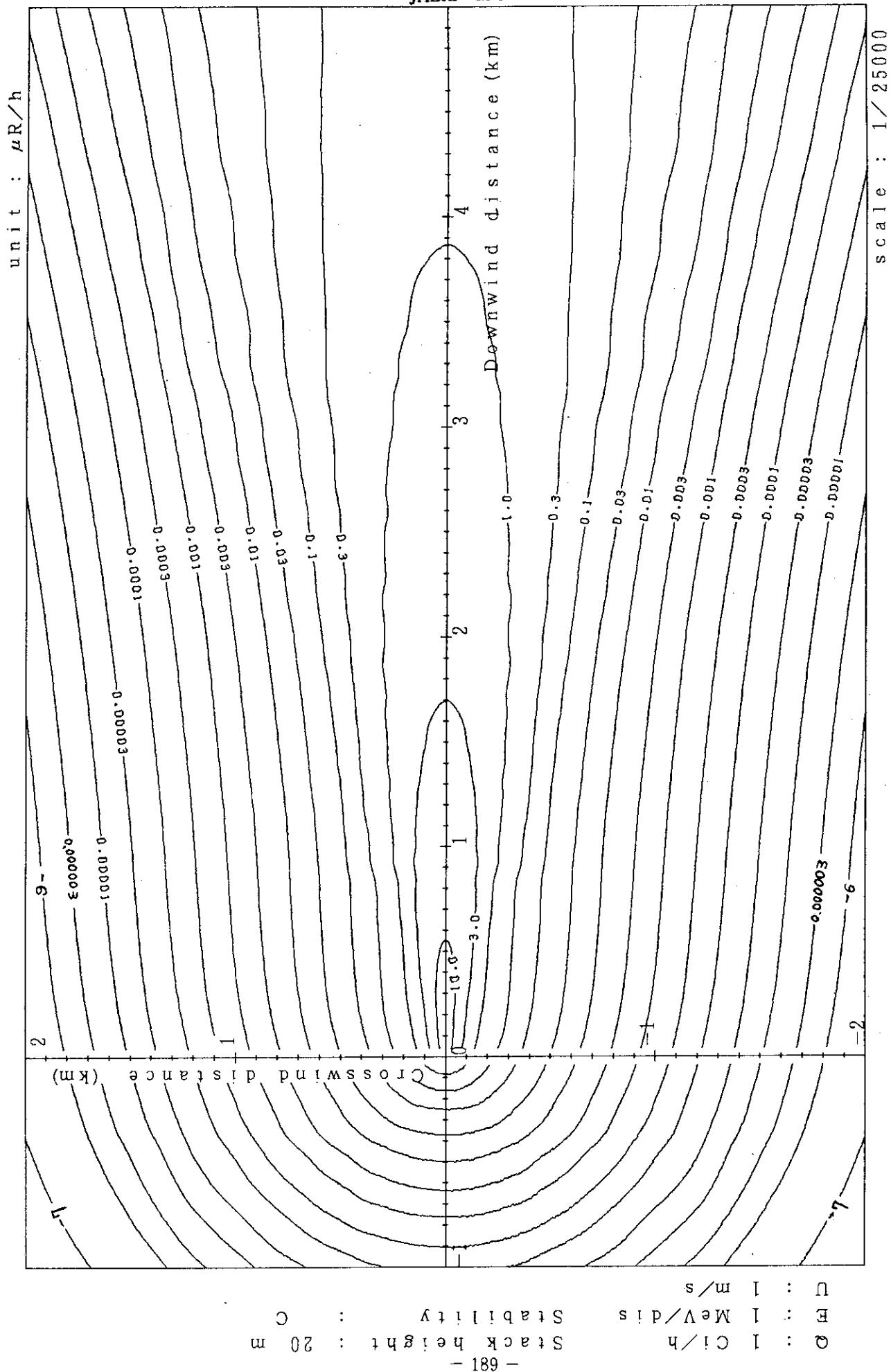


Fig. 4-3-3 (A) Isopleths of surface exposure rate

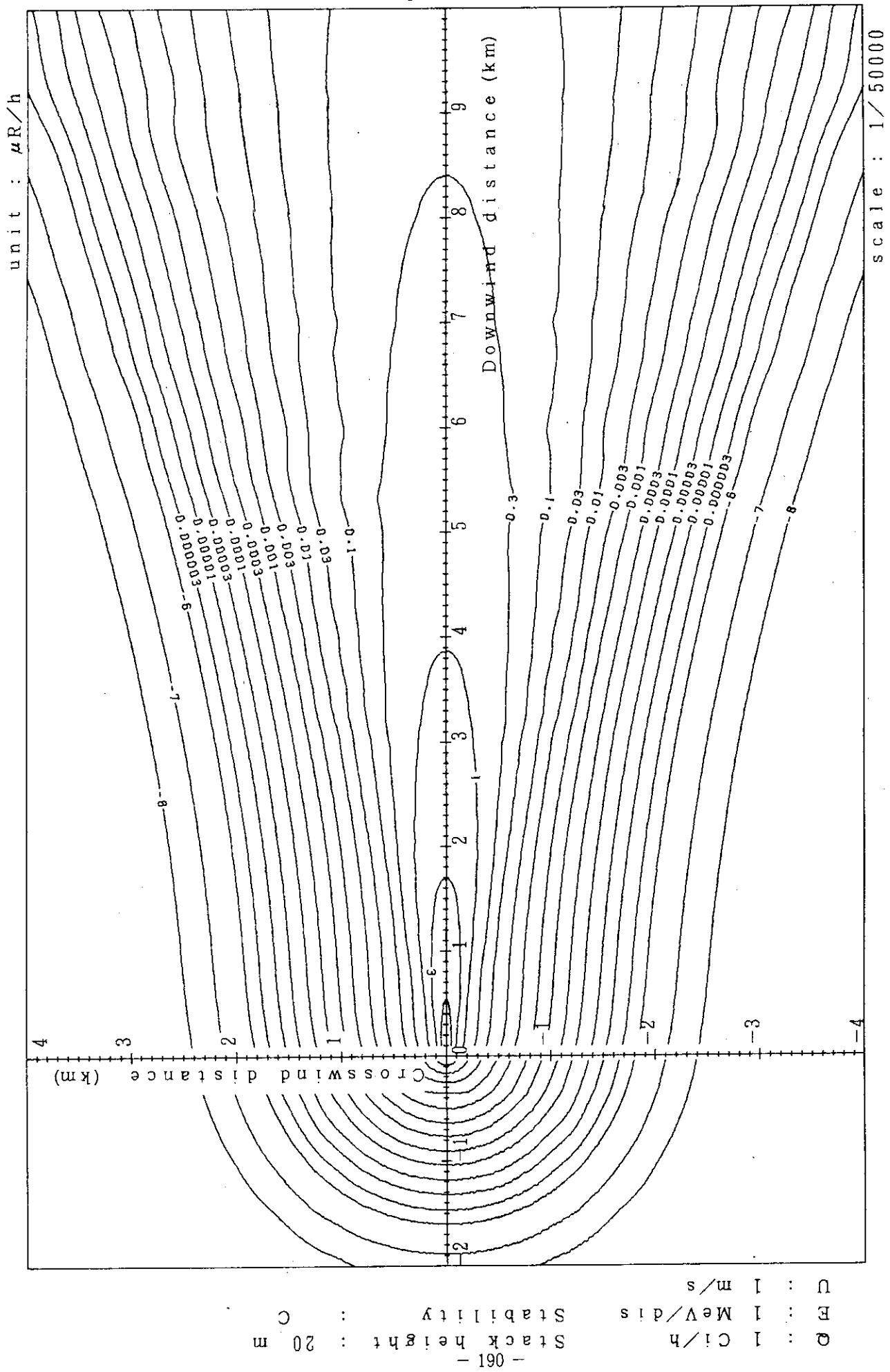


Fig. 4-3-3 (B) Isopleths of surface exposure rate

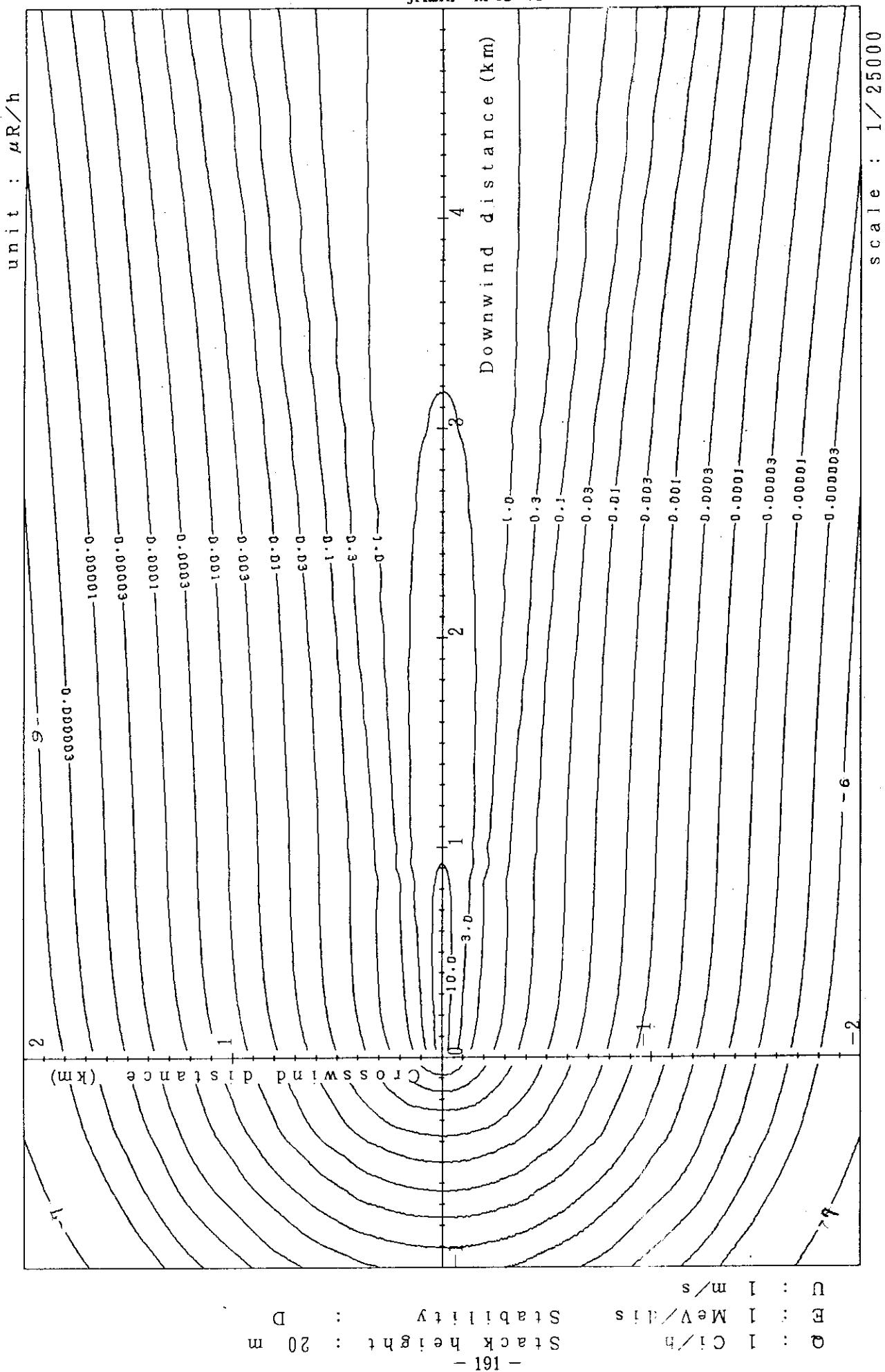


Fig. 4-3-4 (A) Isopleths of surface exposure rate

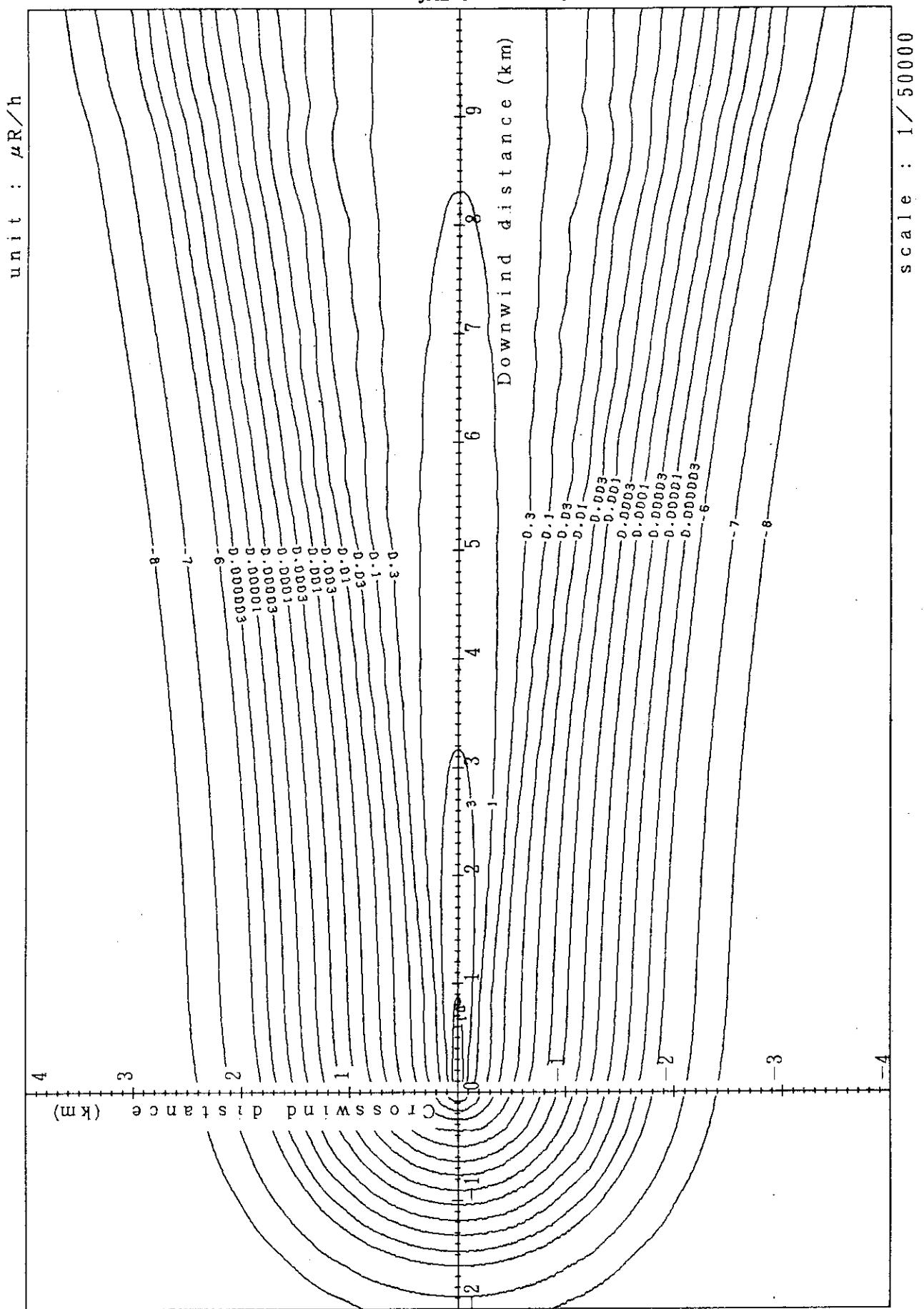


Fig. 4-3-4 (B) Isopleths of surface exposure rate

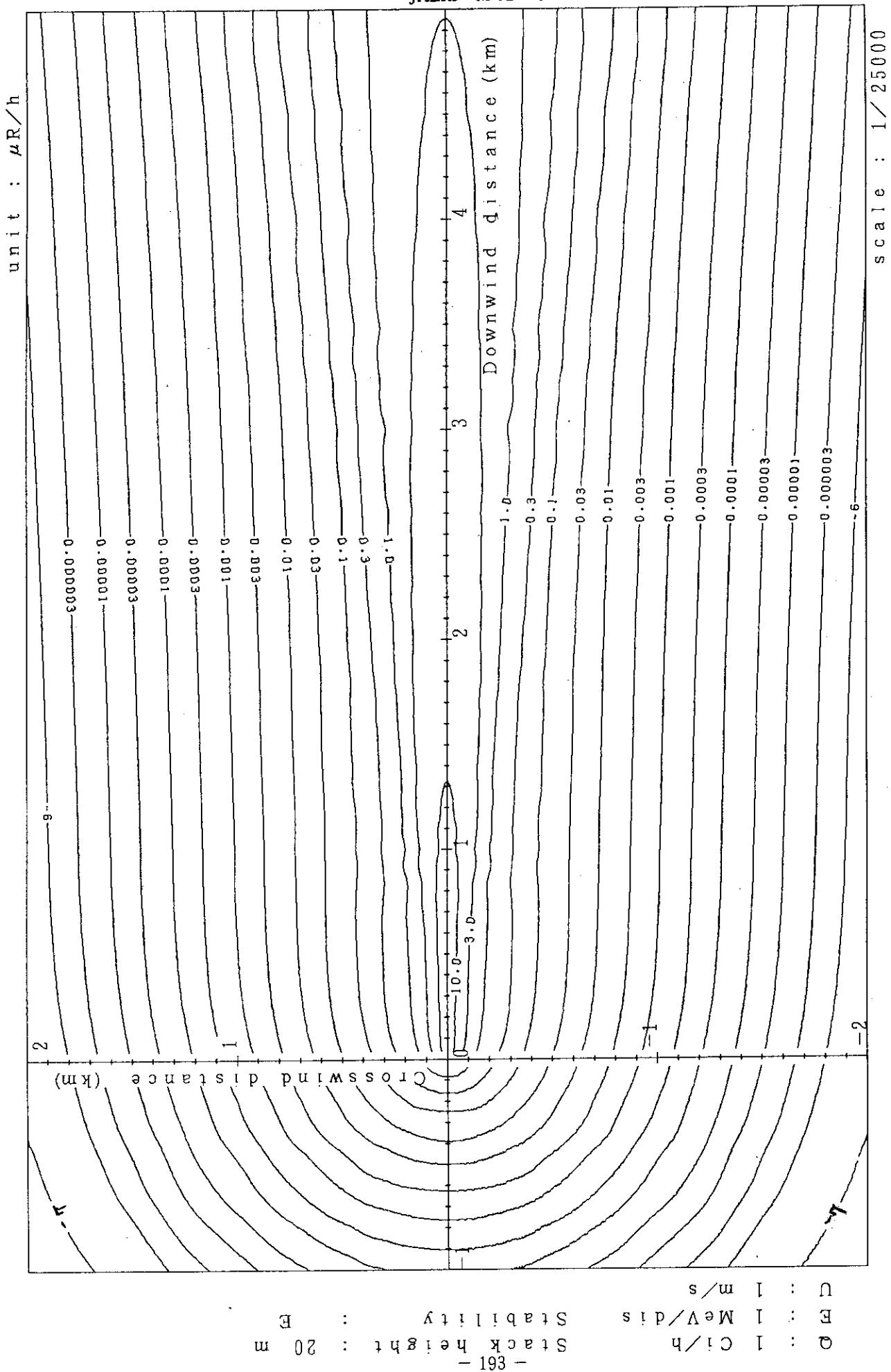


Fig. 4-3-5 (A) Isopleths of surface exposure rate

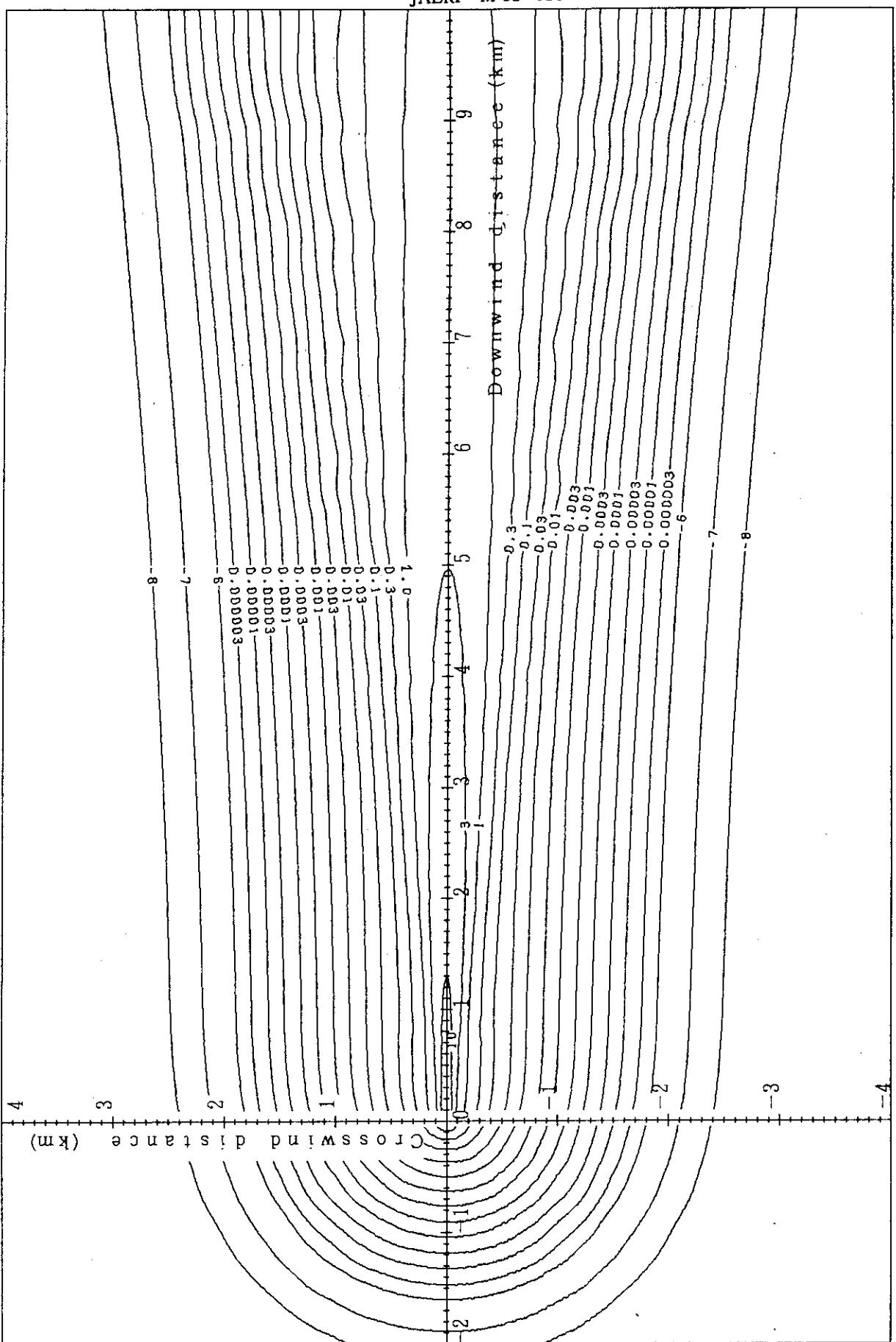
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-3-5(B) Isopleths of surface exposure rate

scale : 1/50000

1 MeV/dis : 20 m  
 1 Stack height : 20 m  
 1 Ci/h :  
 1 Stability :  
 1 Crosswind distance (km) :  
 1 Downwind distance (km) :

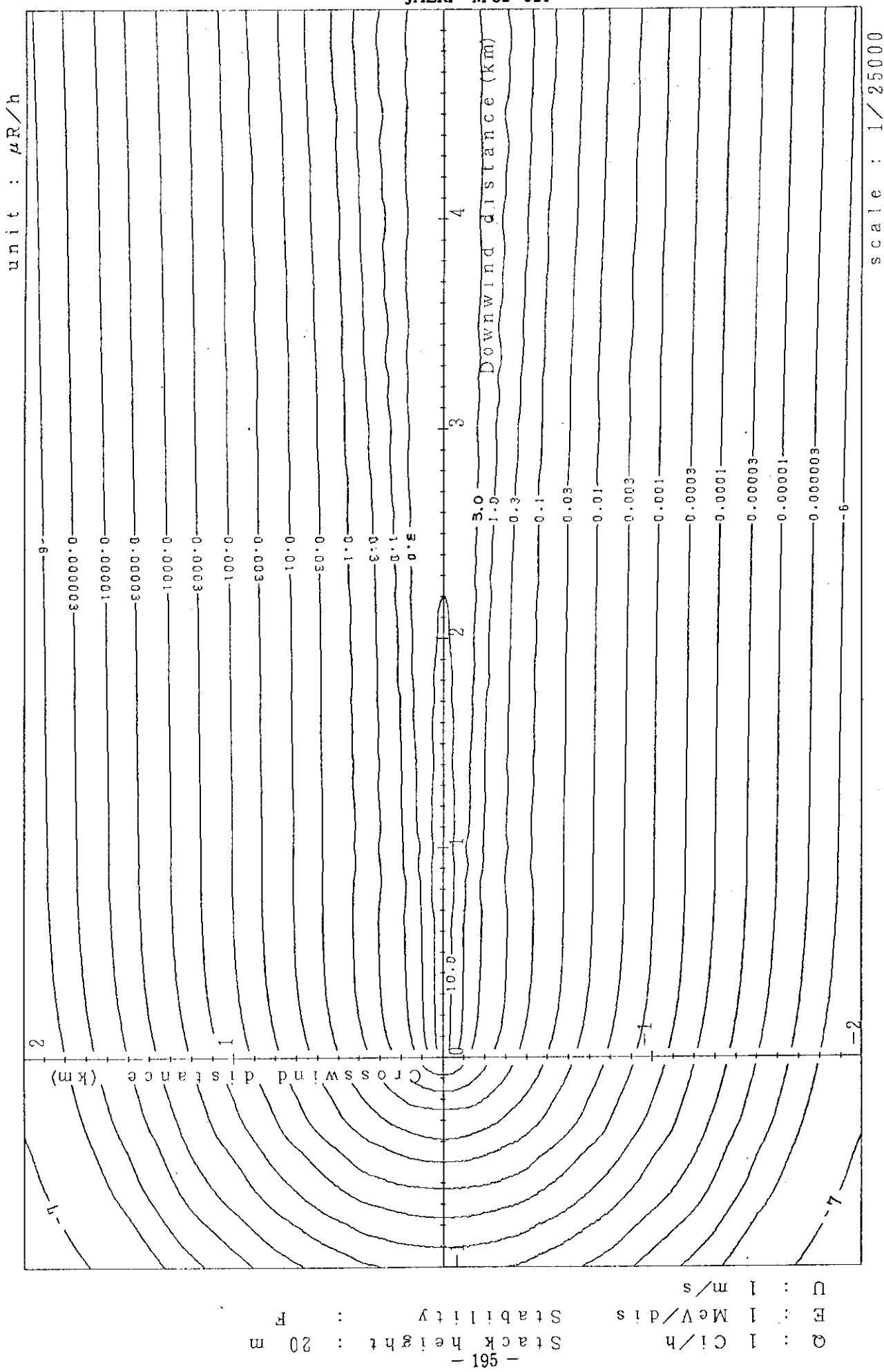


Fig. 4-3-6 (A) Isopleths of surface exposure rate

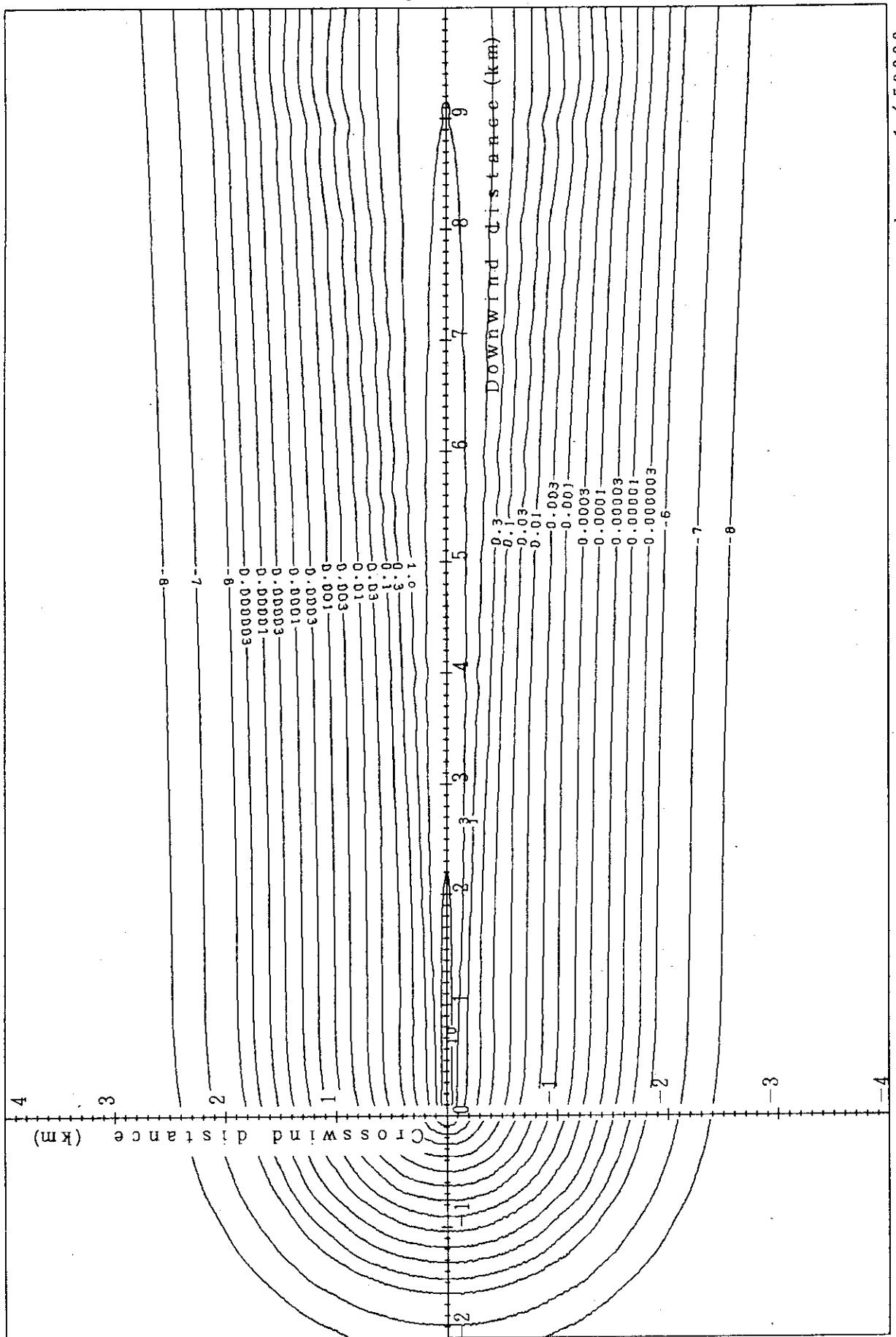
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-3-6 (B) Isopleths of surface exposure rate

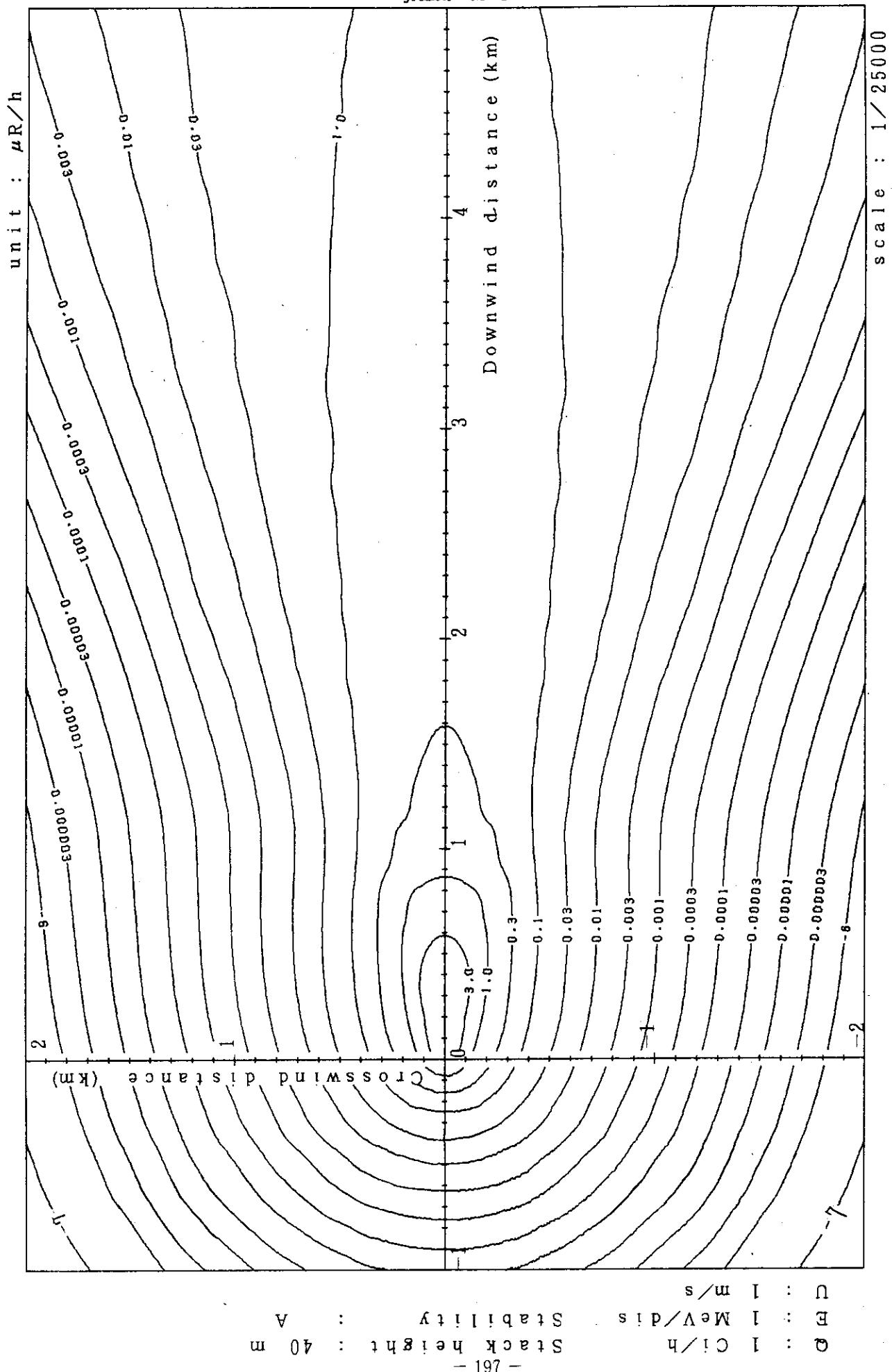


Fig. 4-4-1(A) Isopleths of surface exposure rate

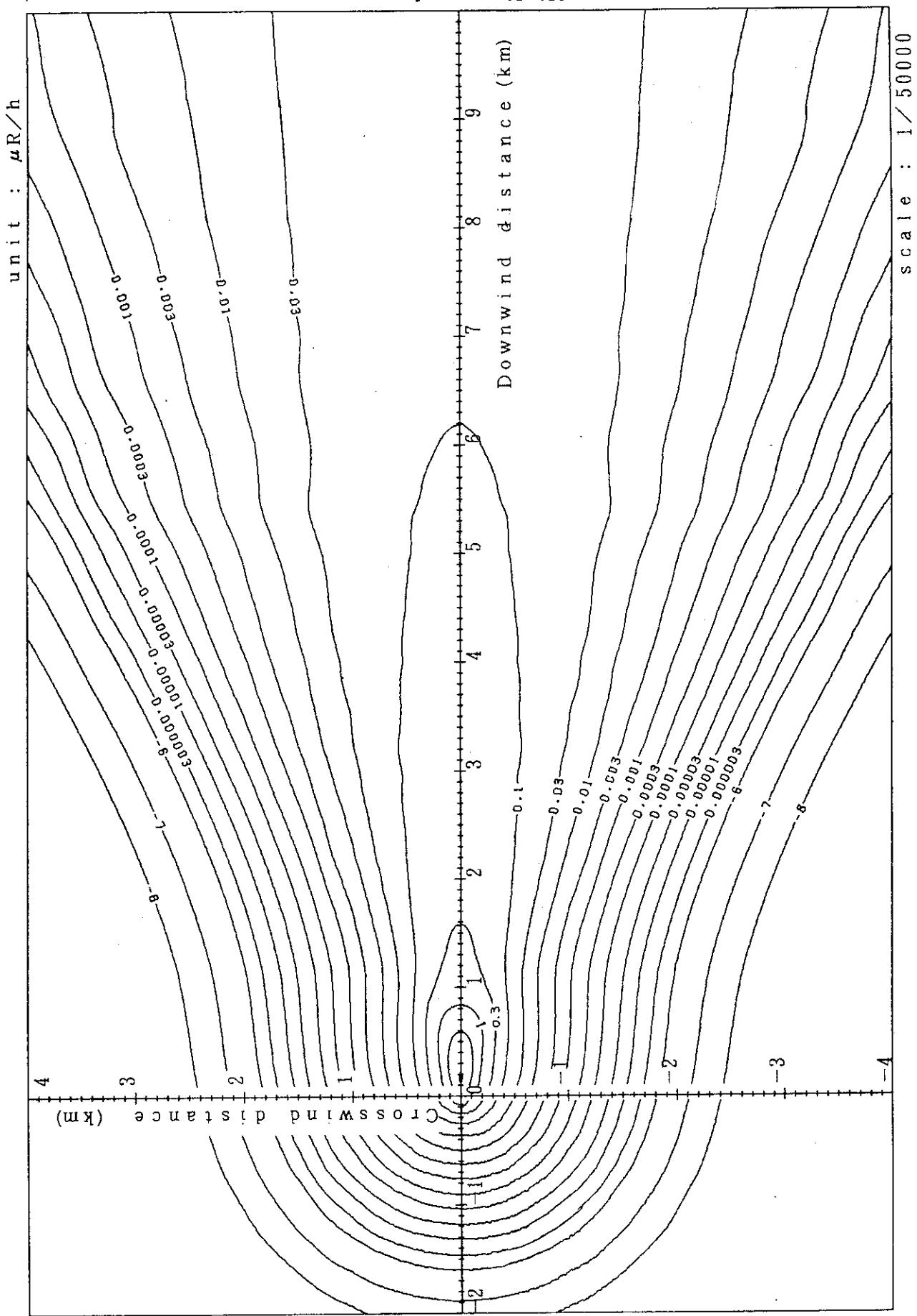


Fig. 4-4-1(B) Isopleths of surface exposure rate

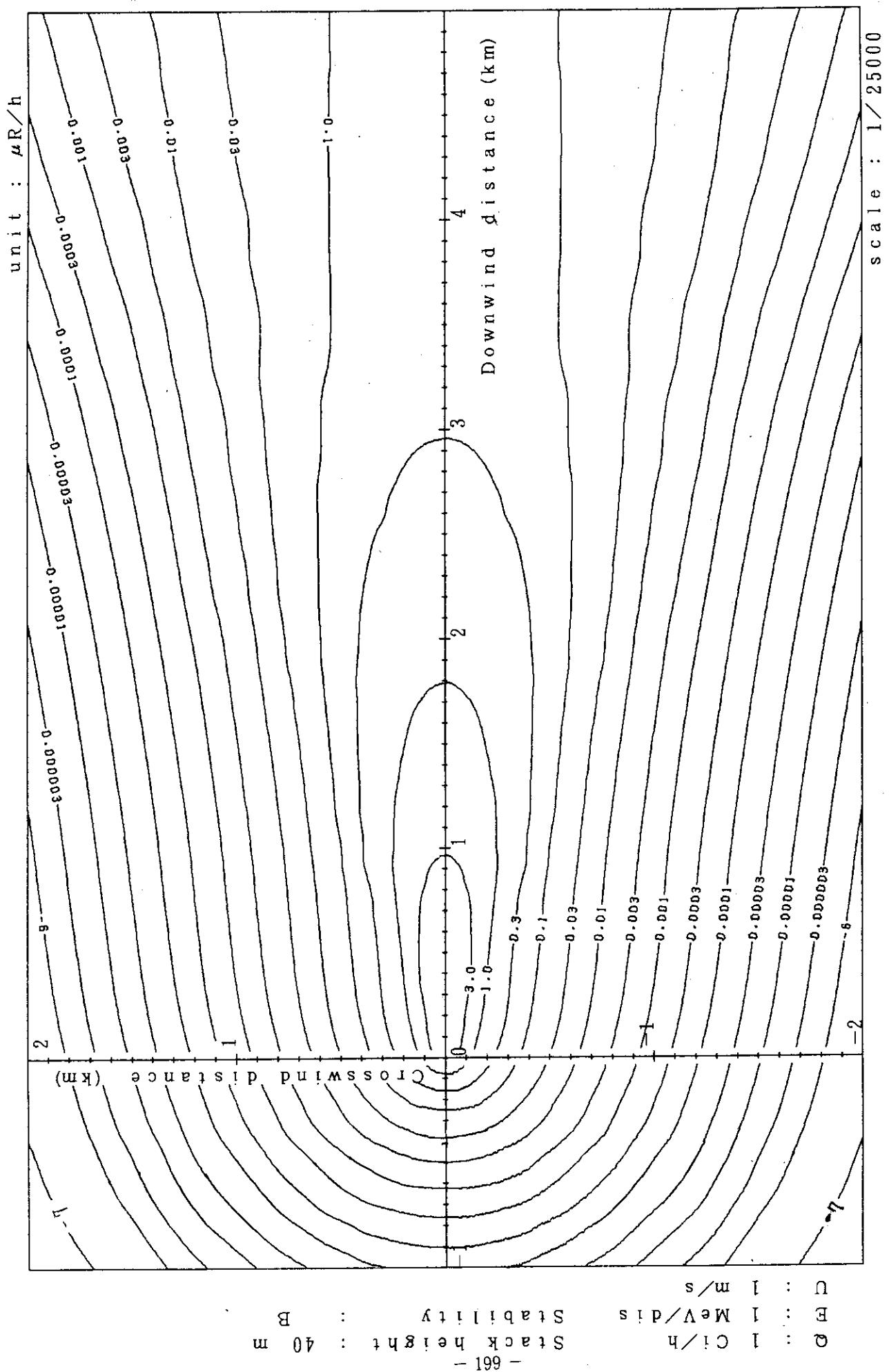


Fig. 4-4-2 (A) Isopleths of surface exposure rate

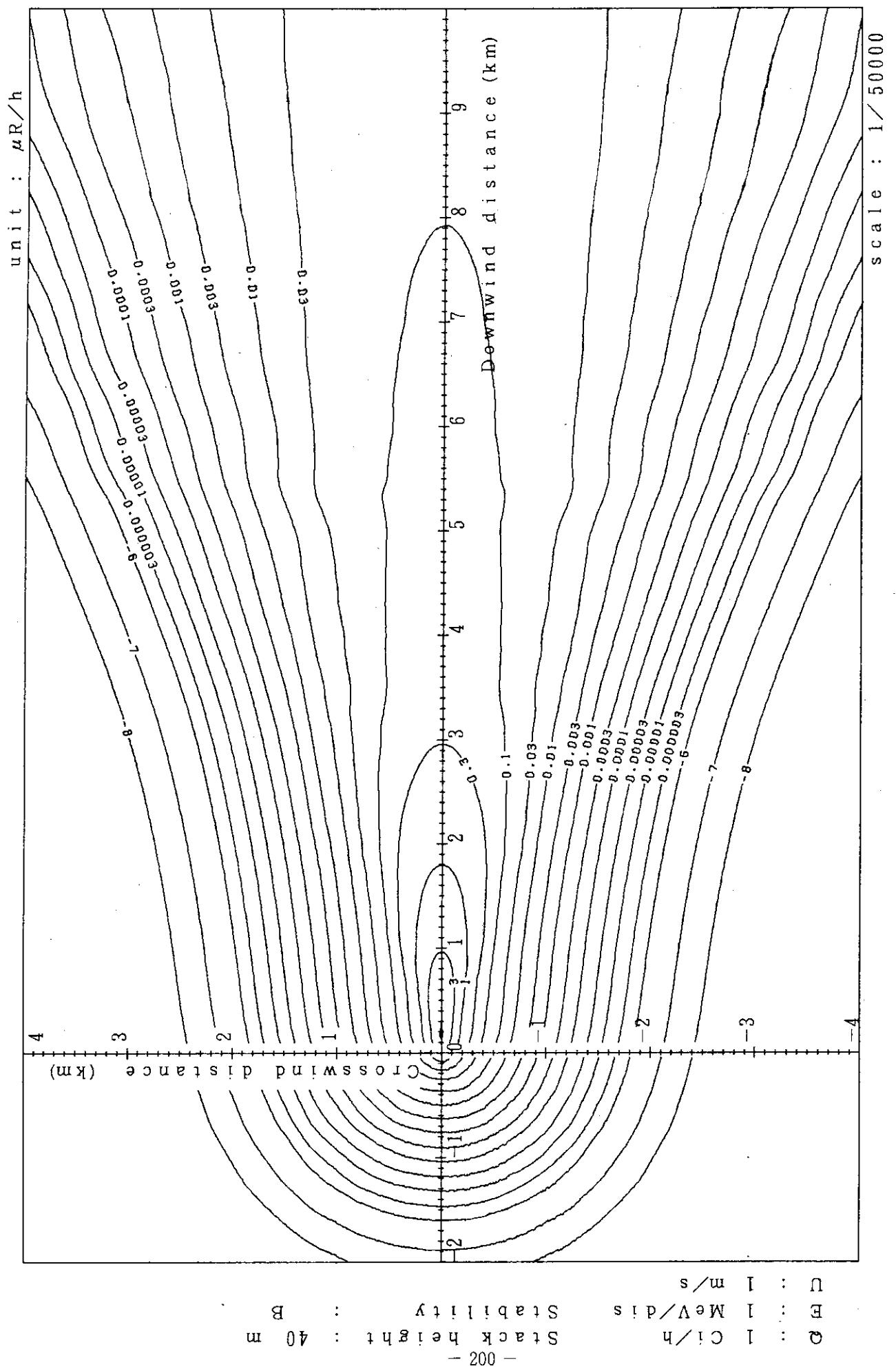


Fig. 4-4-2 (B) Isopleths of surface exposure rate

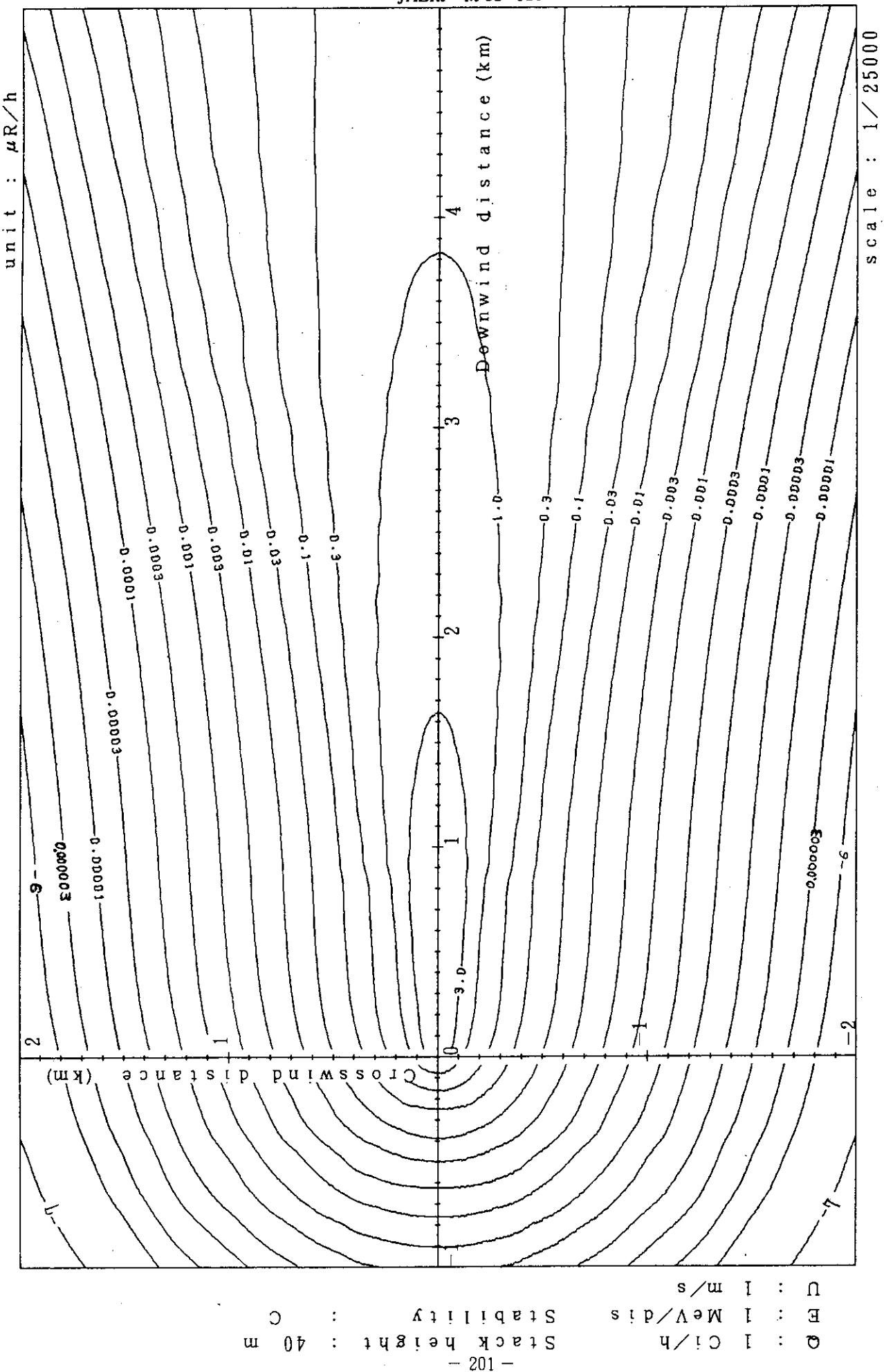
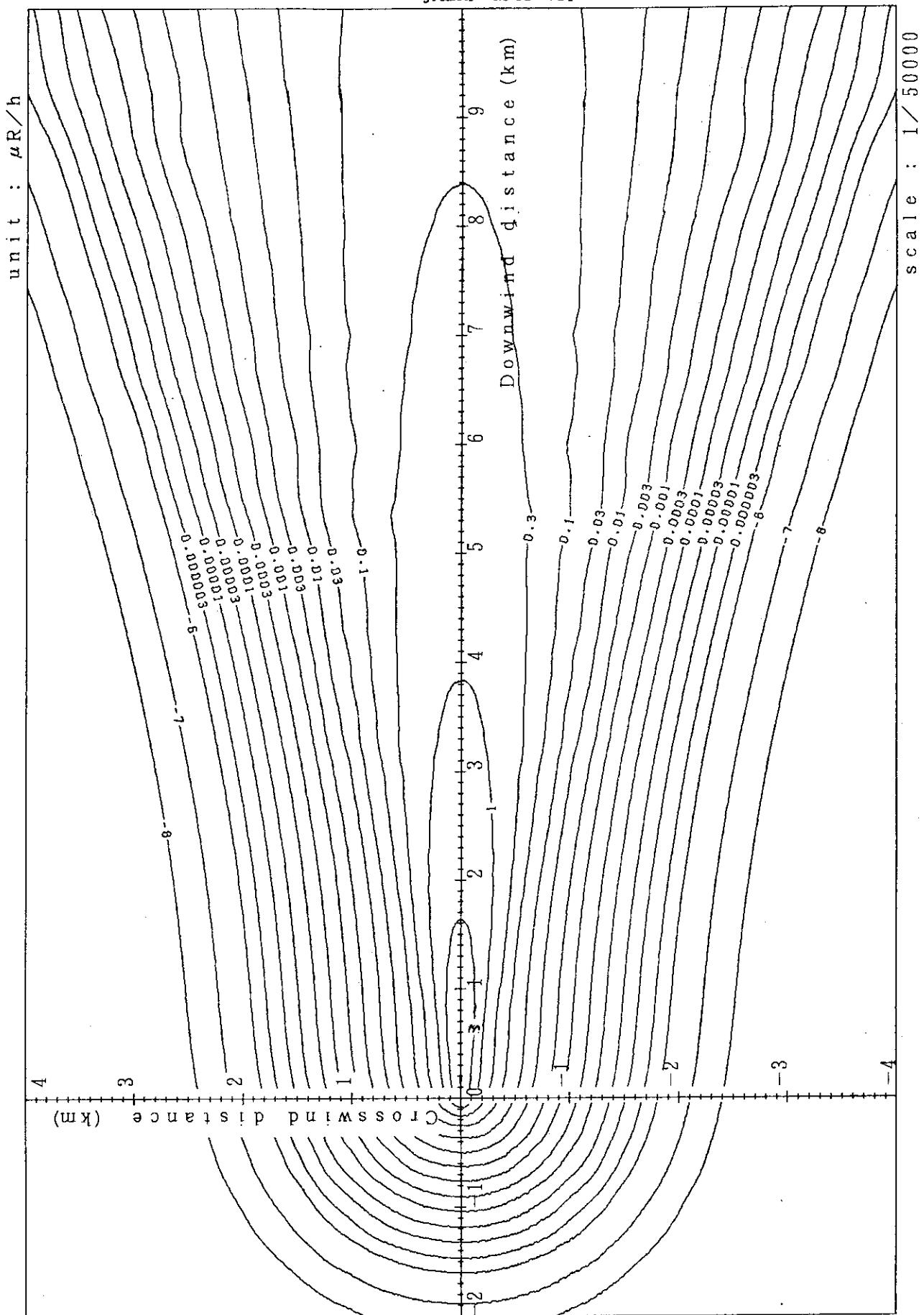


Fig. 4-4-3(A) Isopleths of surface exposure rate



Q E : 1 Ci/h      Stack height : 40 m  
 Q E : 1 MeV/di/s      Stability : C  
 Q E : 1 m/s      Unit :  $\mu\text{R}/\text{h}$

Fig. 4-4-3 (B) Isopleths of surface exposure rate

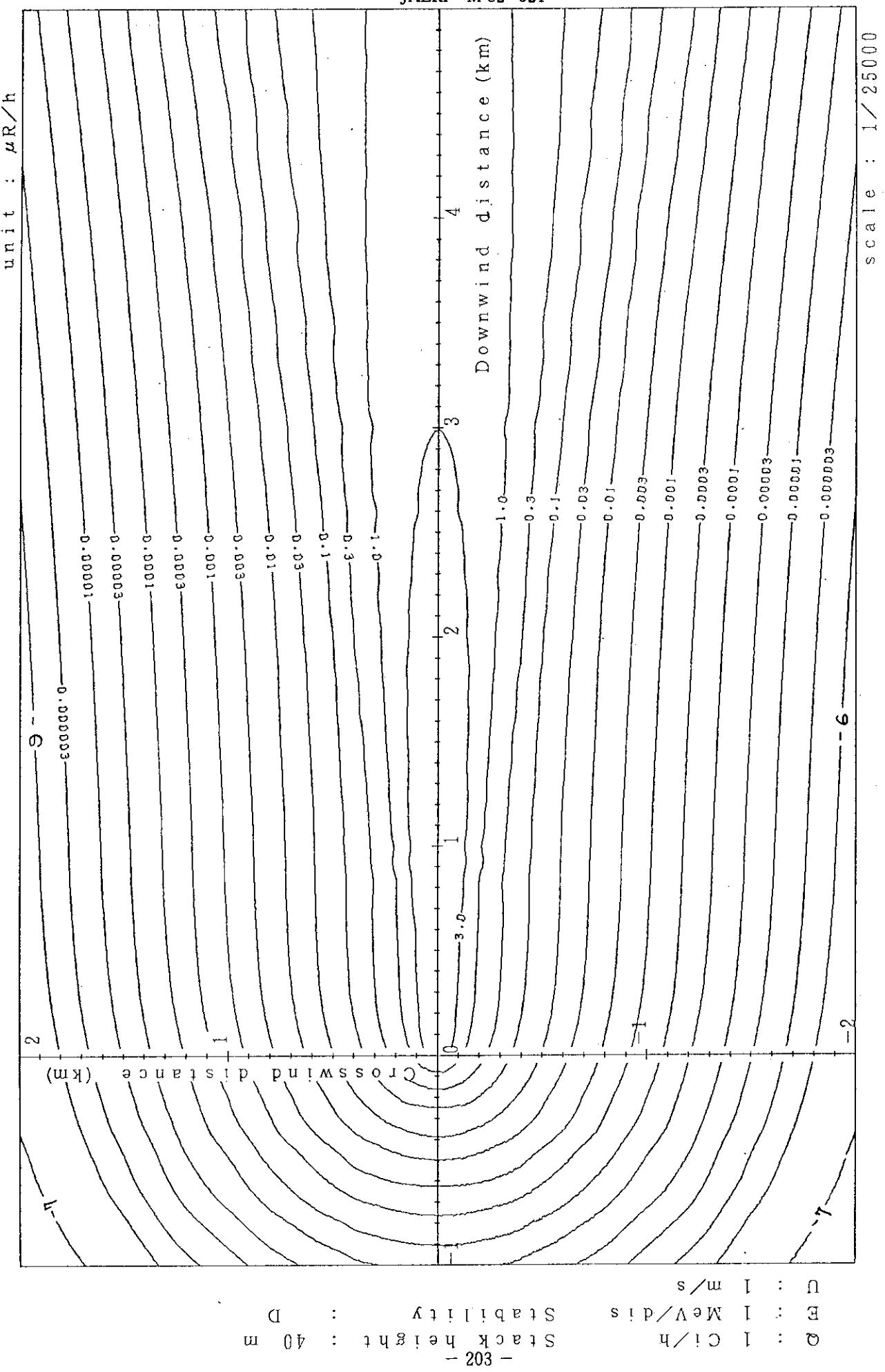


Fig. 4-4-4 (A) Isopleths of surface exposure rate

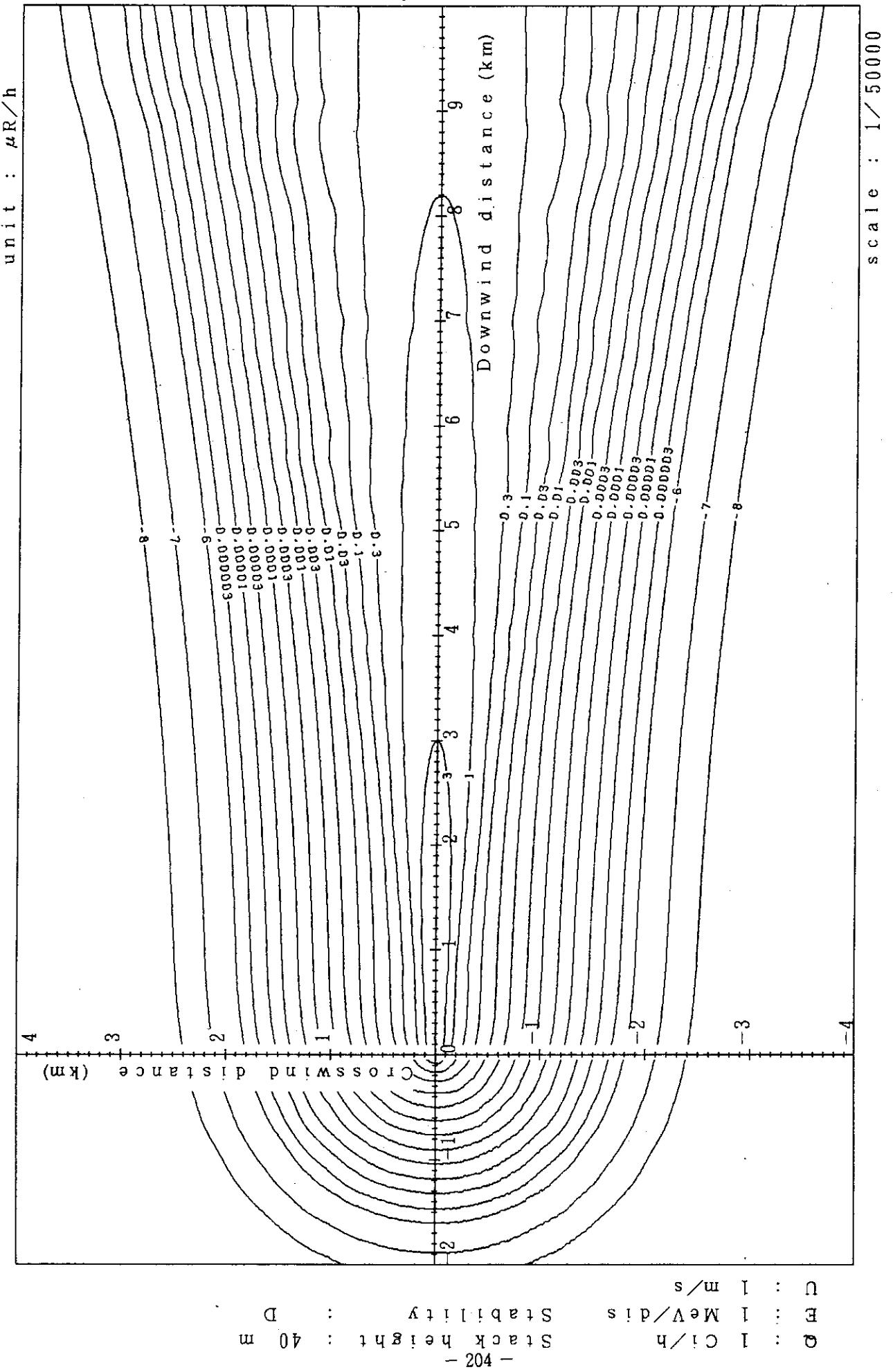
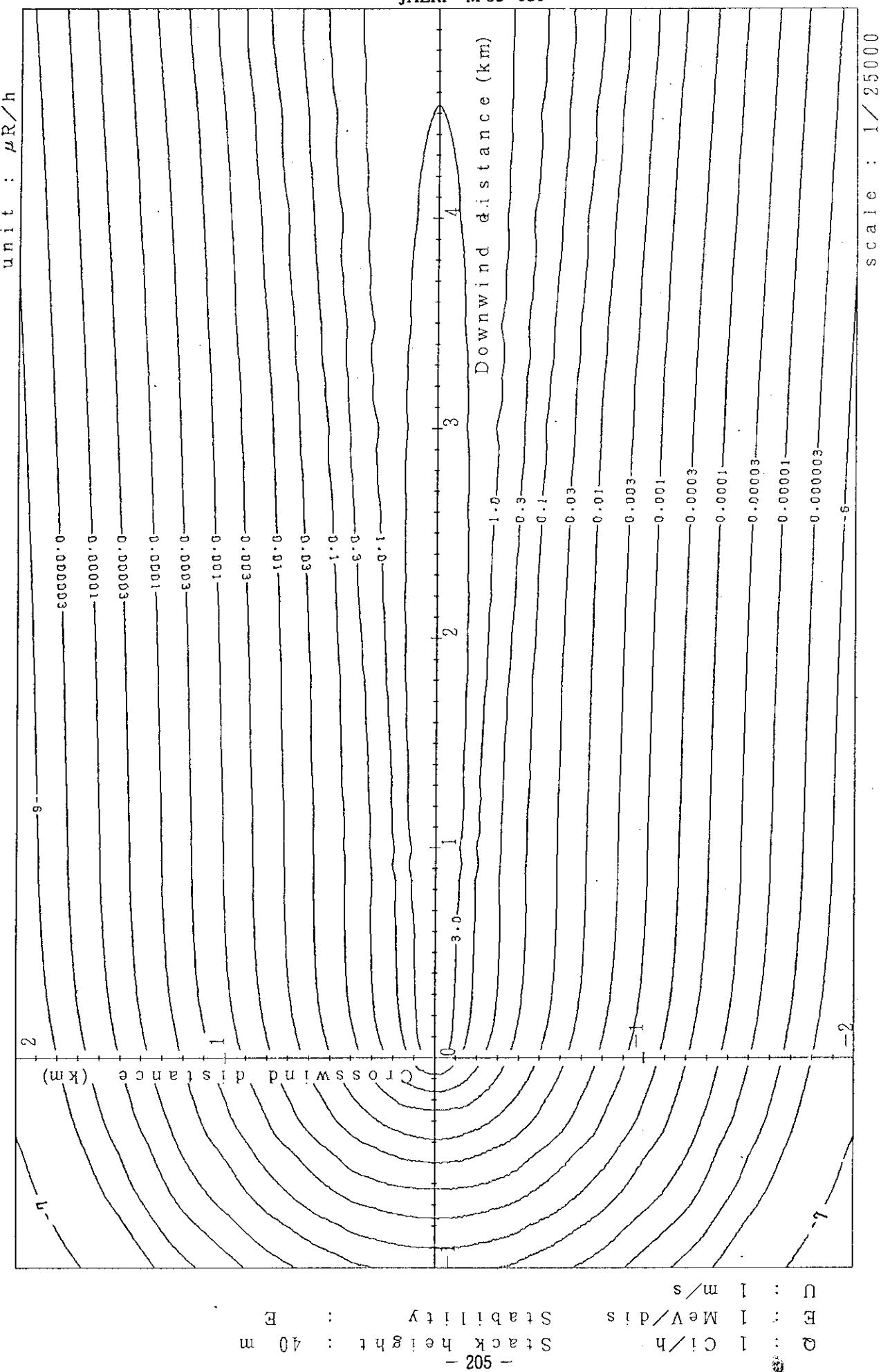


Fig. 4-4-4(B) Isopleths of surface exposure rate

JAERI - M 82- 021



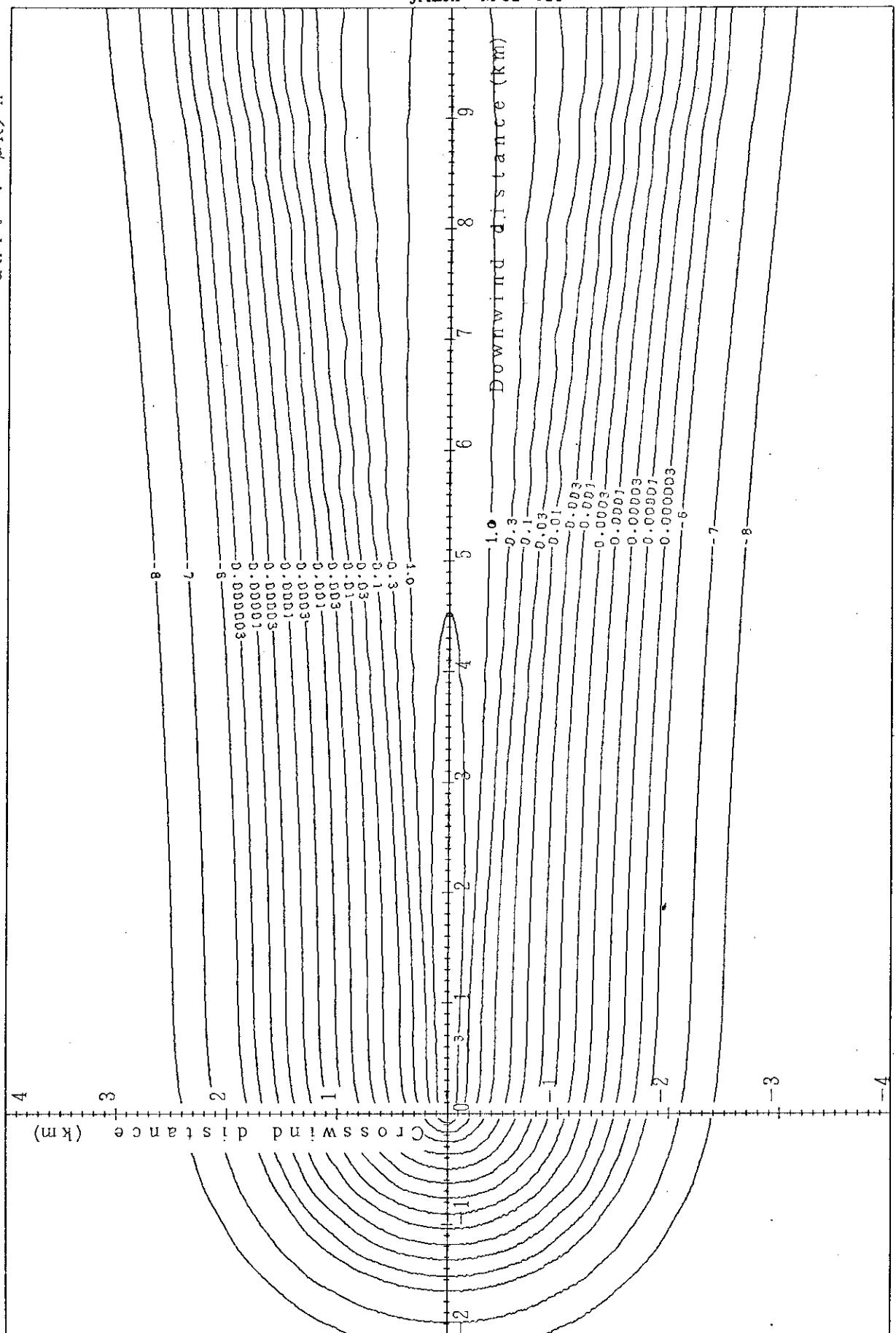
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-4-5 (B) Isopleths of surface exposure rate  
scale : 1/50000

Unit :  $\mu\text{R}/\text{h}$   
E : 1 MeV/d<sub>is</sub>  
C : 1 Ci/h  
S : 1 m/s  
Stack height : 40 m  
- 90 -

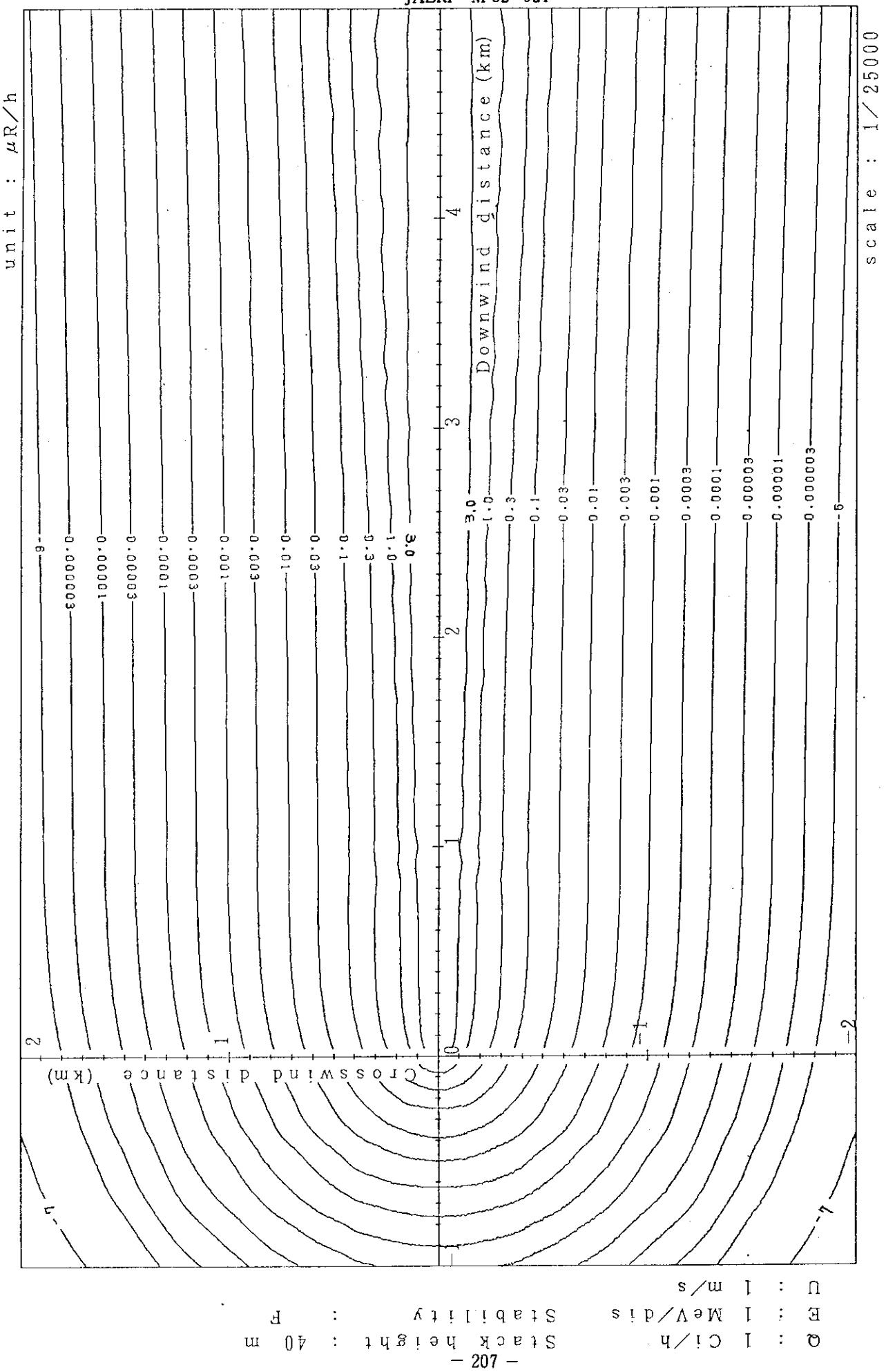


Fig. 4-4-6 (A) Isopleths of surface exposure rate

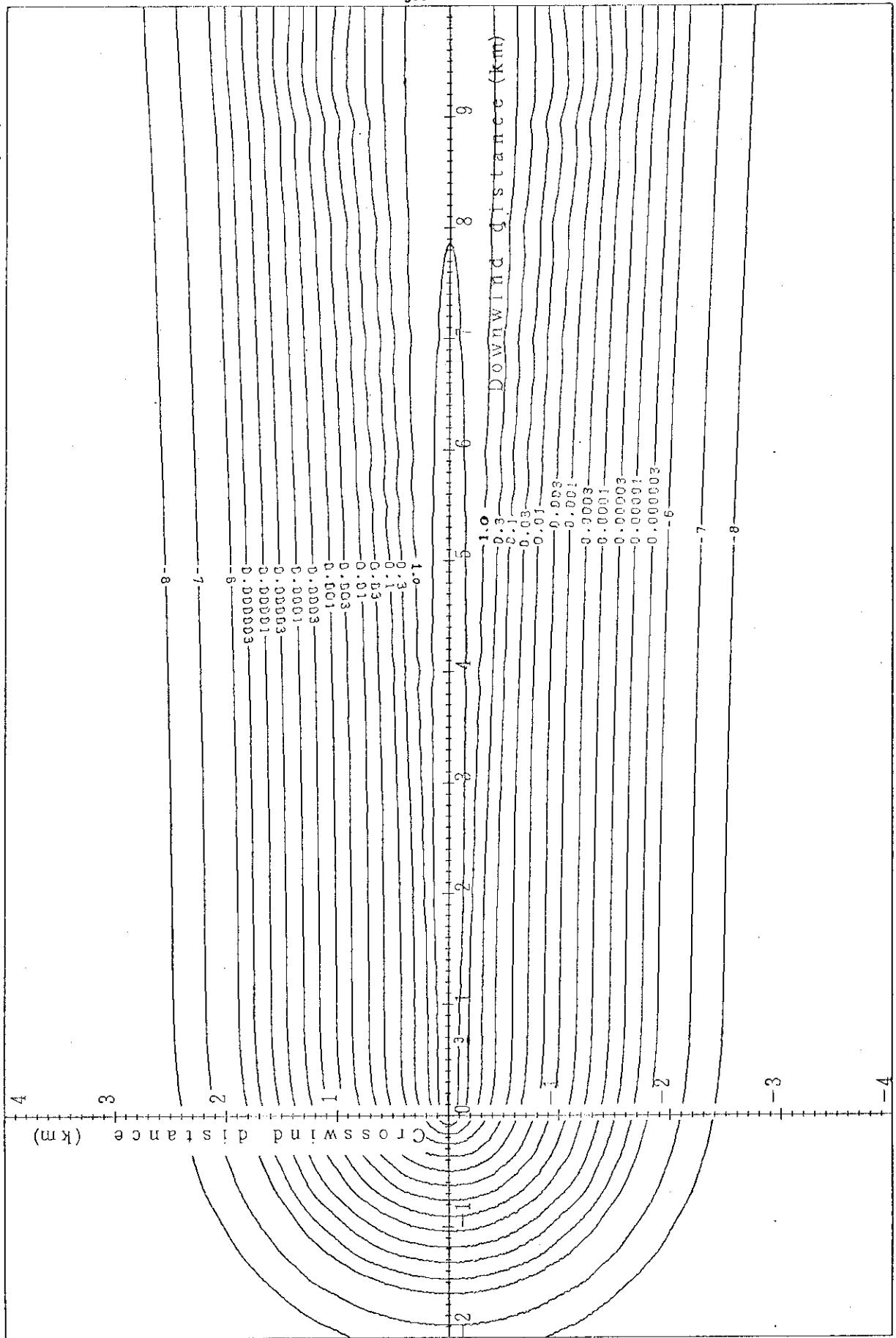
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-4-6 (B) Isopleths of surface exposure rate

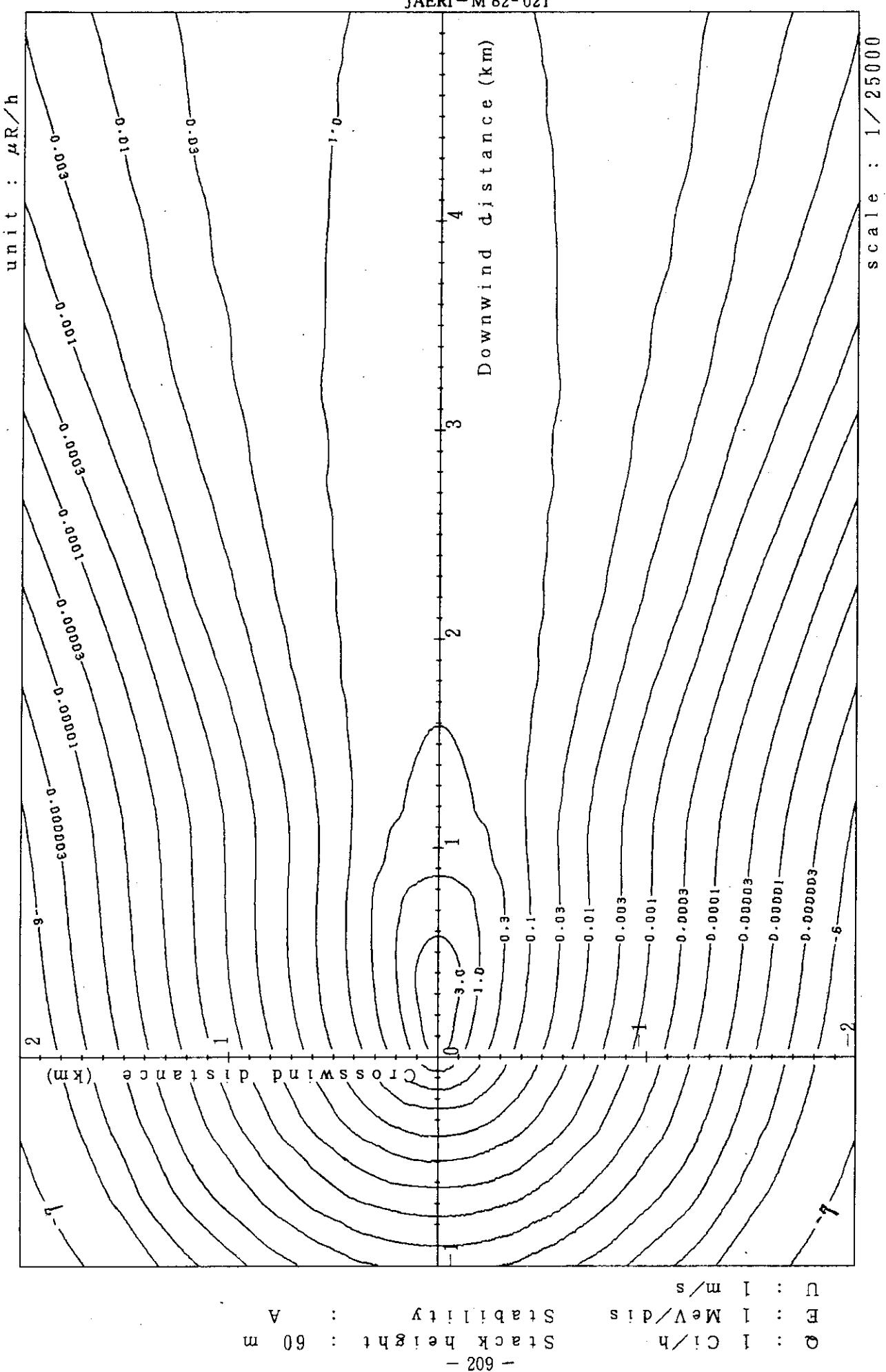


Fig. 4-5-1(A) Isopleths of surface exposure rate

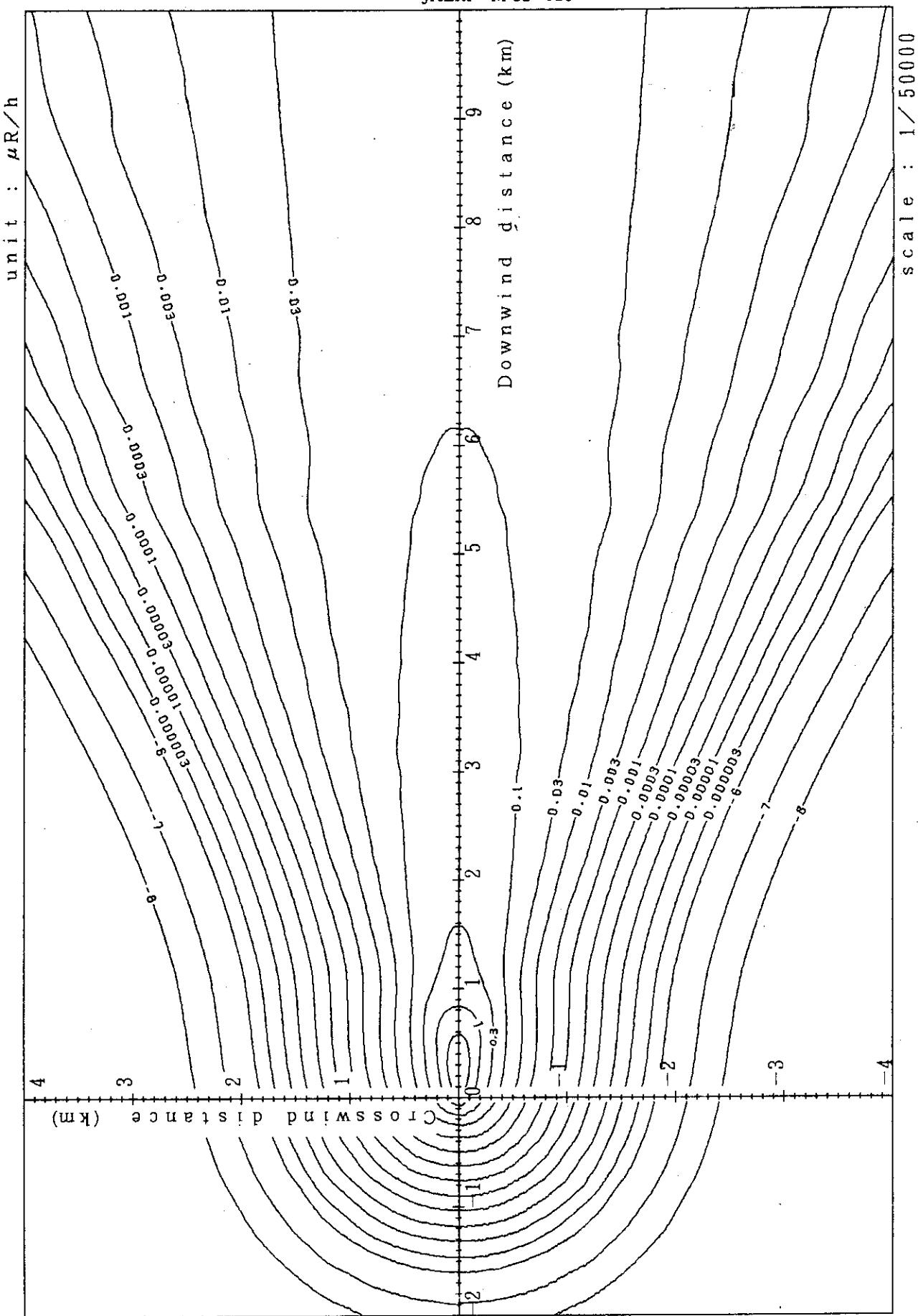


Fig. 4-5-1(B) Isopleths of surface exposure rate  
 C.E. : 1 Ci/h Stabili ty : 60 m  
 C.E. : 1 MeV/di s  
 C.E. : 1 m/s

Fig. 4-5-1(B) Isopleths of surface exposure rate

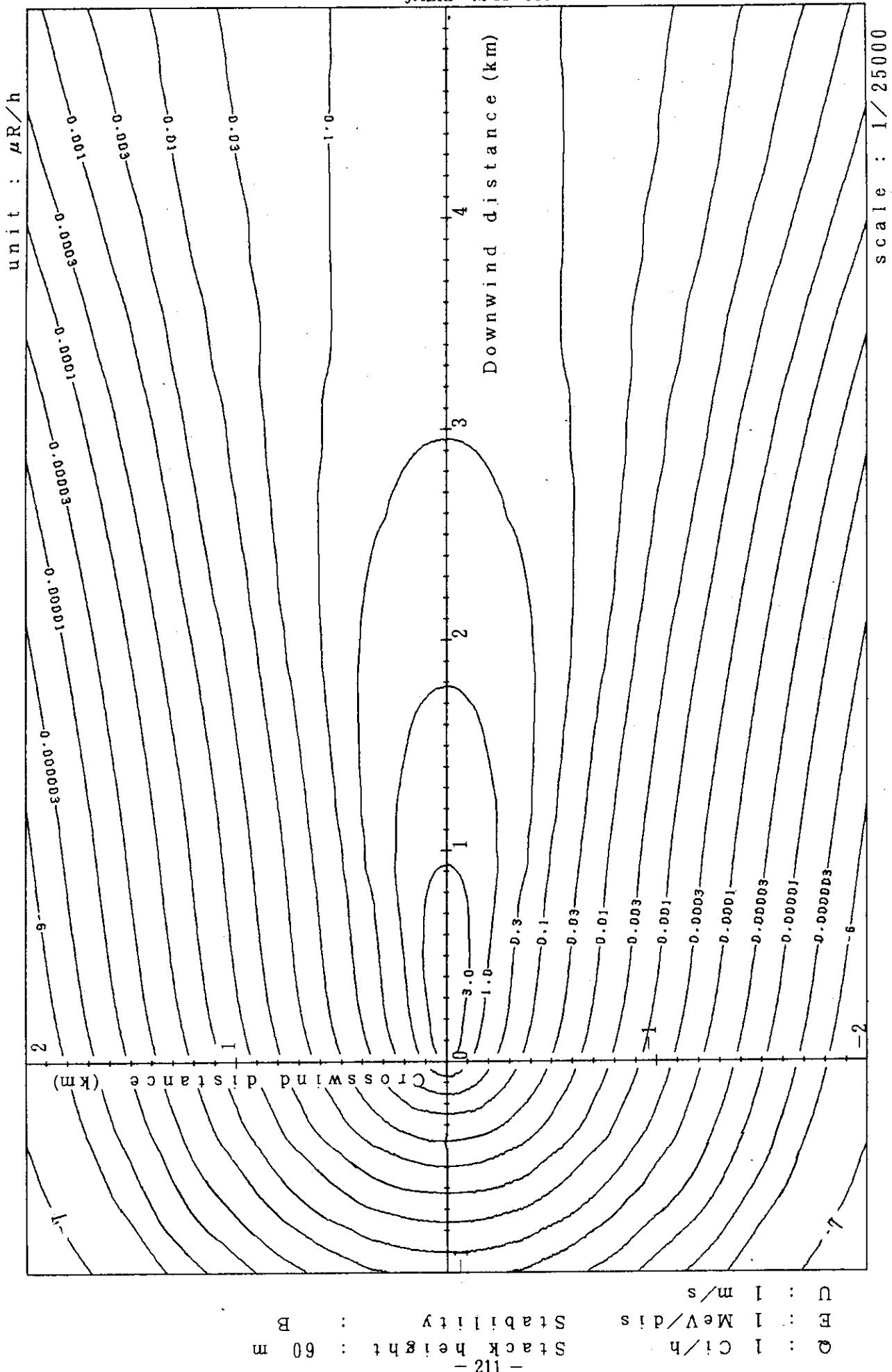


Fig. 4-5-2 (A) Isopleths of surface exposure rate

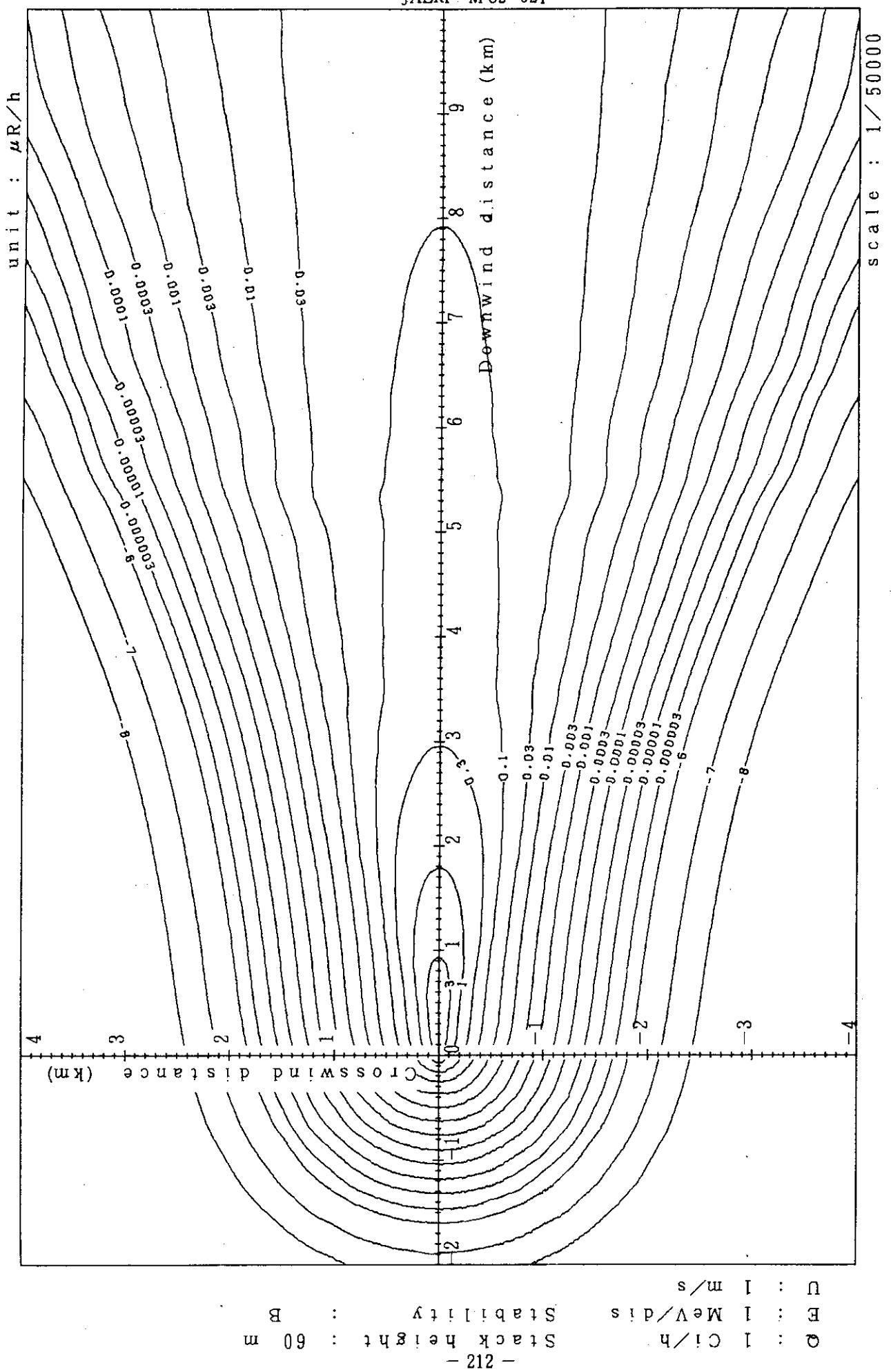


Fig. 4-5-2 (B) Isopleths of surface exposure rate

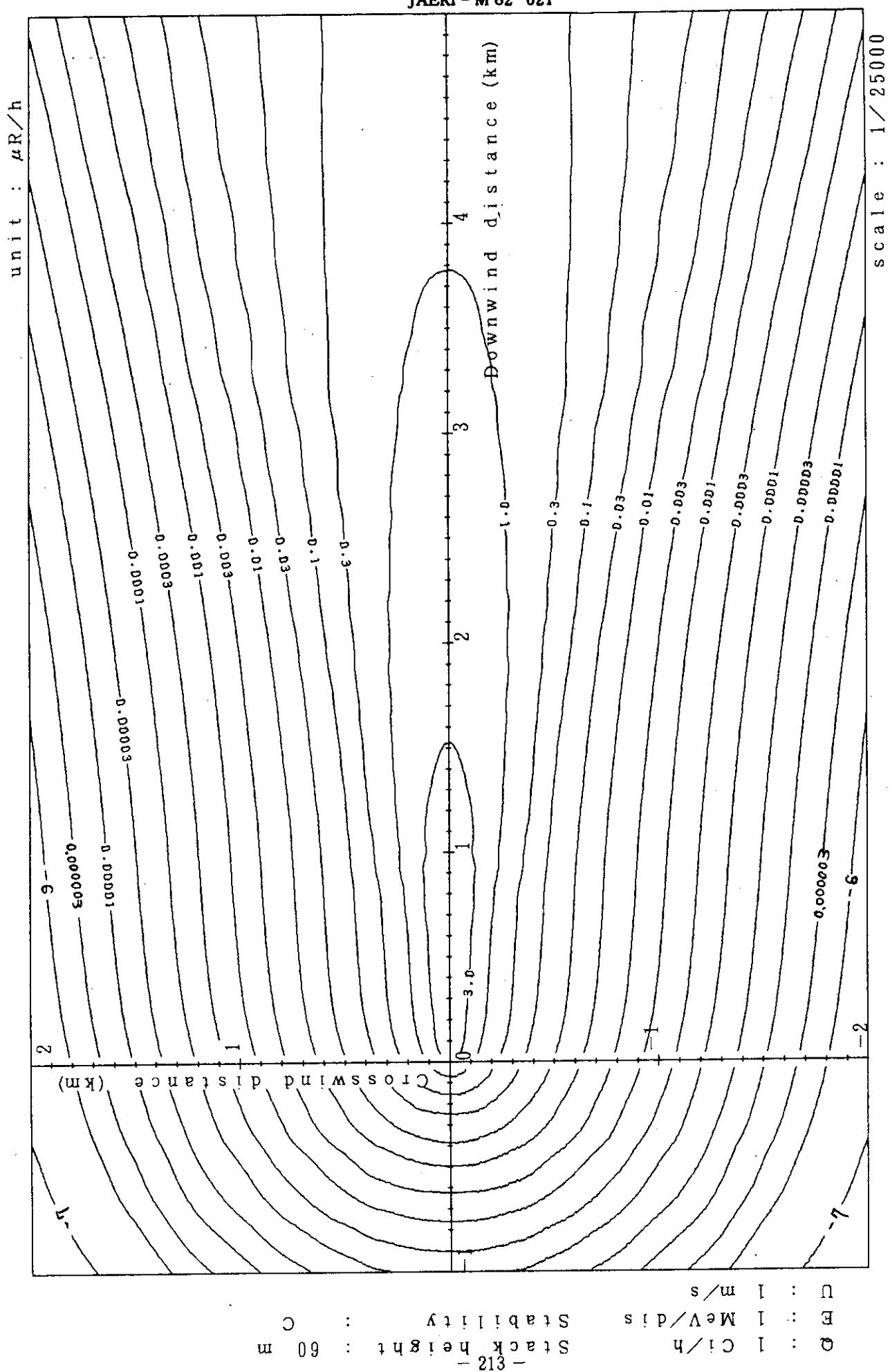


Fig. 4-5-3(A) Isopleths of surface exposure rate

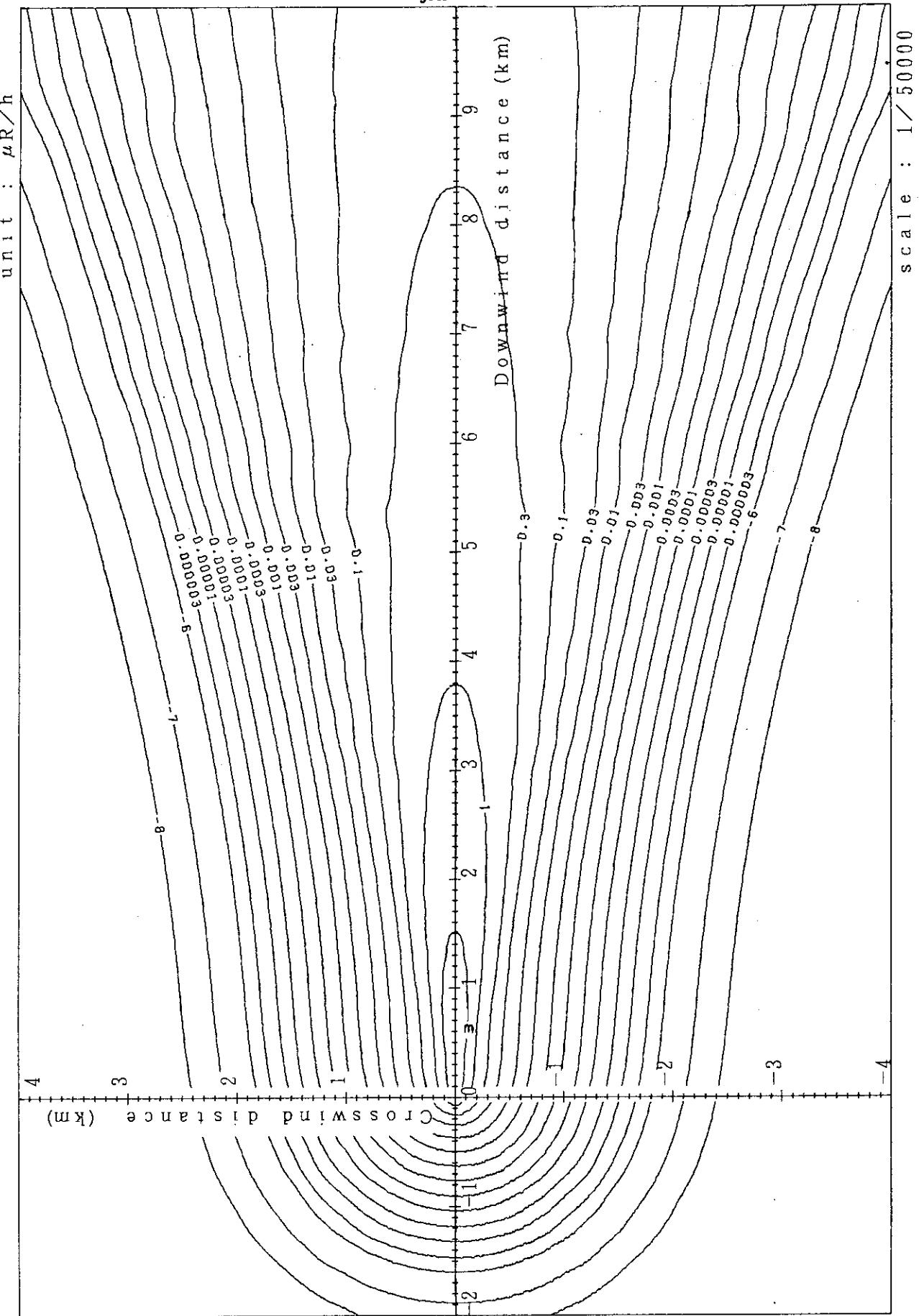


Fig. 4-5-3(B) Isopleths of surface exposure rate

Unit :  $\mu\text{R}/\text{h}$   
 Stack height : 60 m  
 Stabili ty : C  
 $C_1/\text{h}$  : 1.1 MeV/di s  
 Crosswind distance (km) : -2 1 2 3 4 5 6 7 8 9

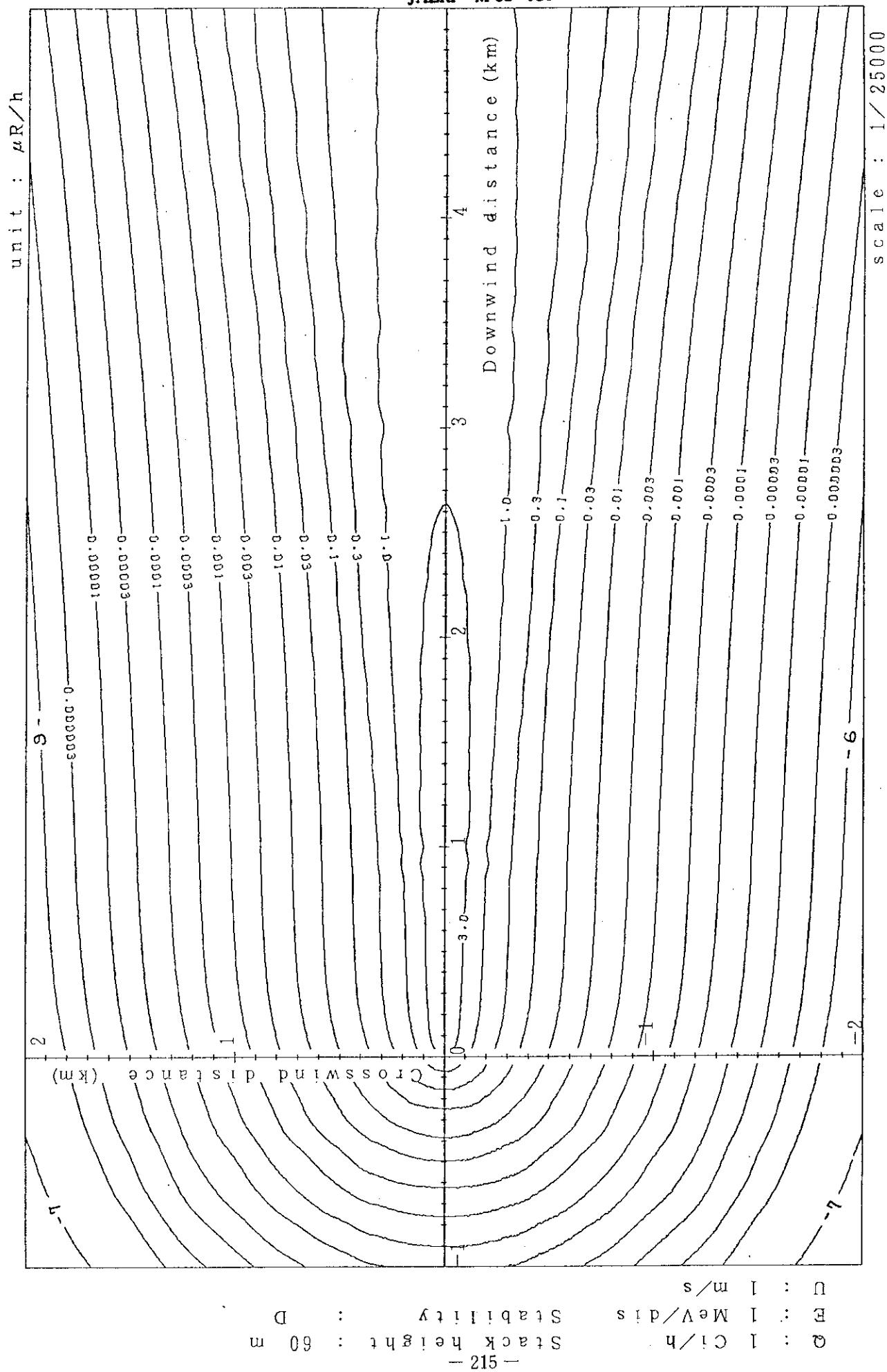


Fig. 4-5-4(A) Isopleths of surface exposure rate

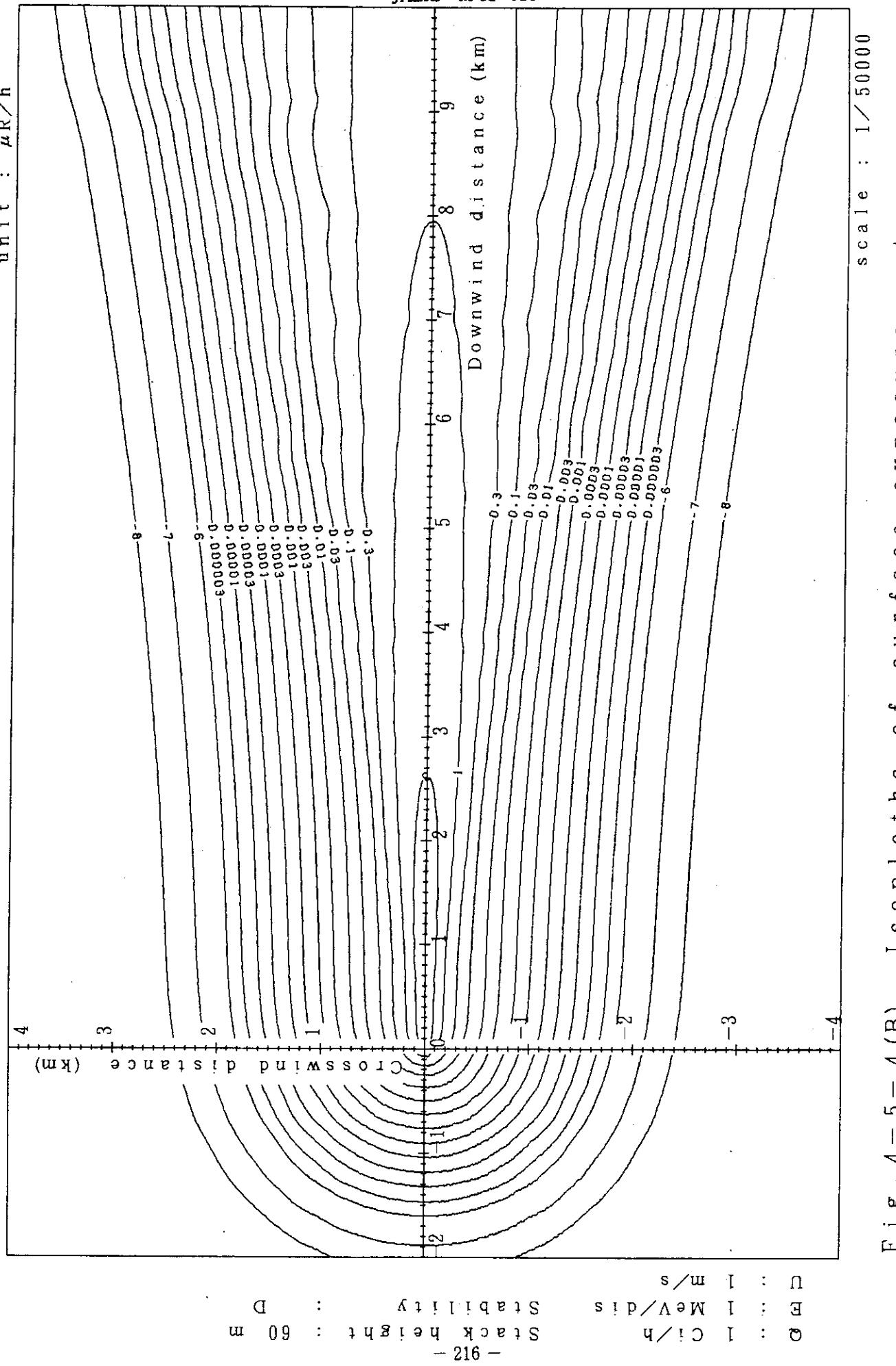


Fig. 4-5-4(B) Isopleths of surface exposure rate

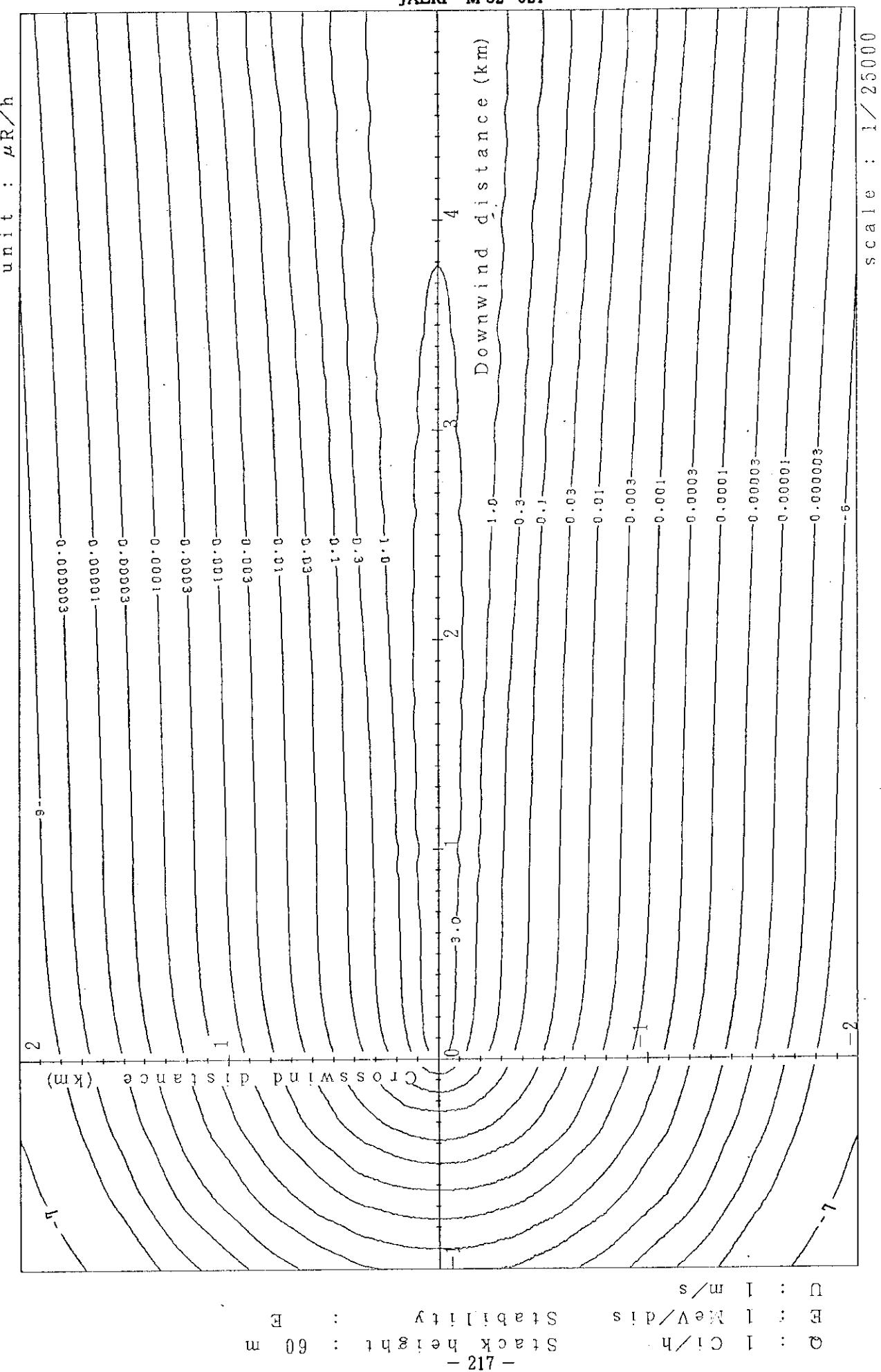


Fig. 4-5-5 (A) Isopleths of surface exposure rate

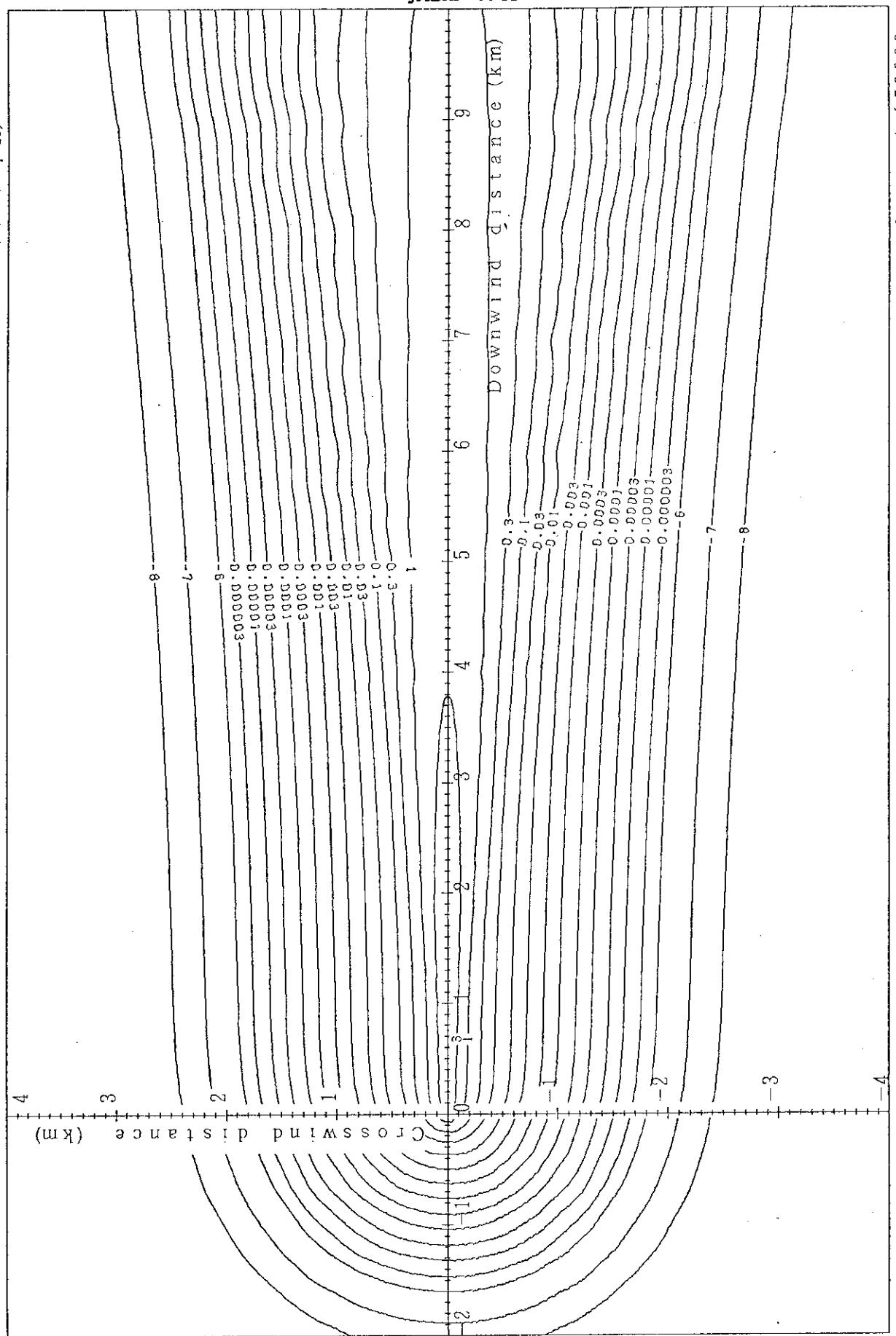
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-5-5 (B) Isopleths of surface exposure rate

scale : 1/50000

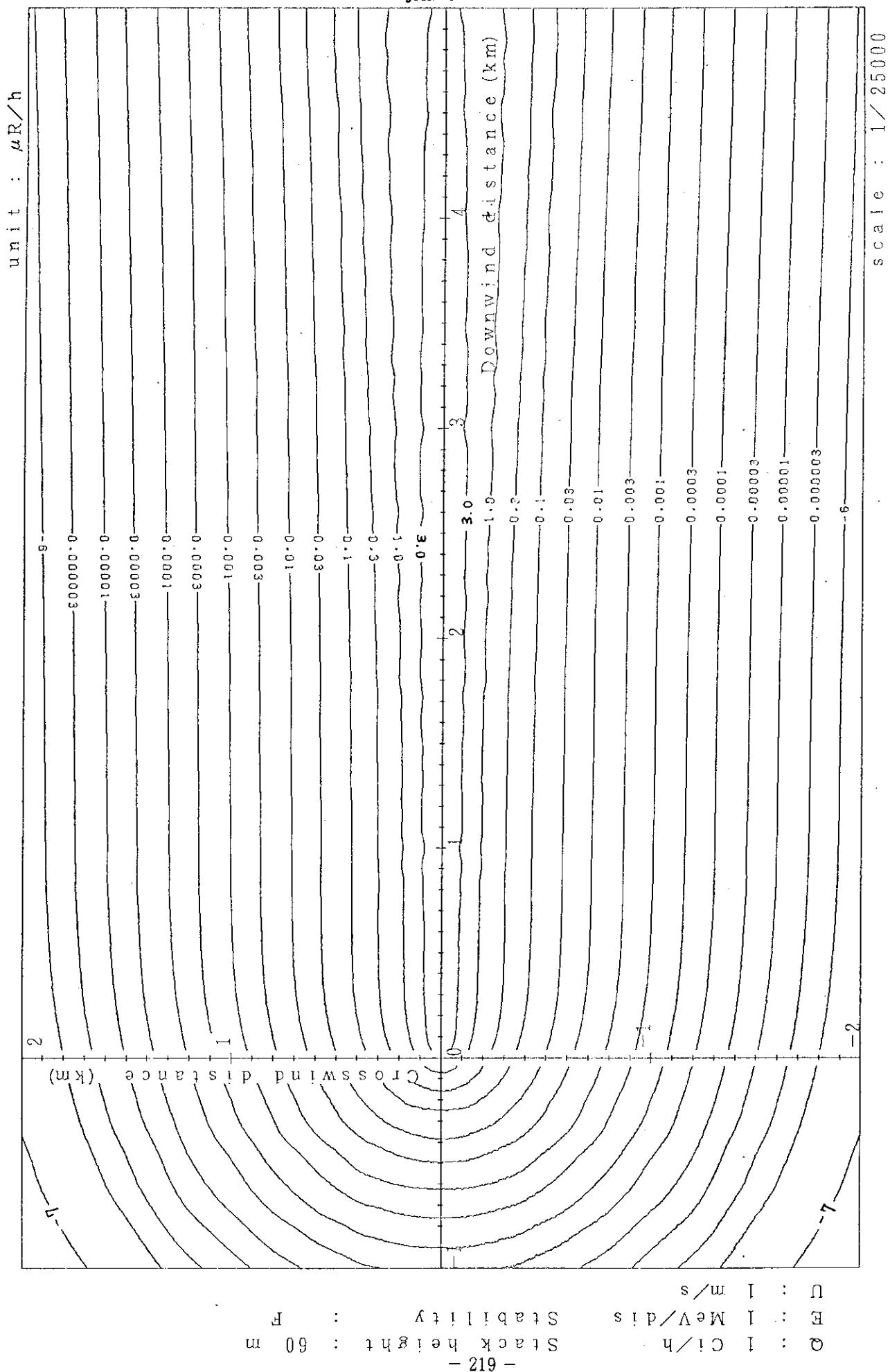


Fig. 4-5-6 (A) Isopleths of surface exposure rate

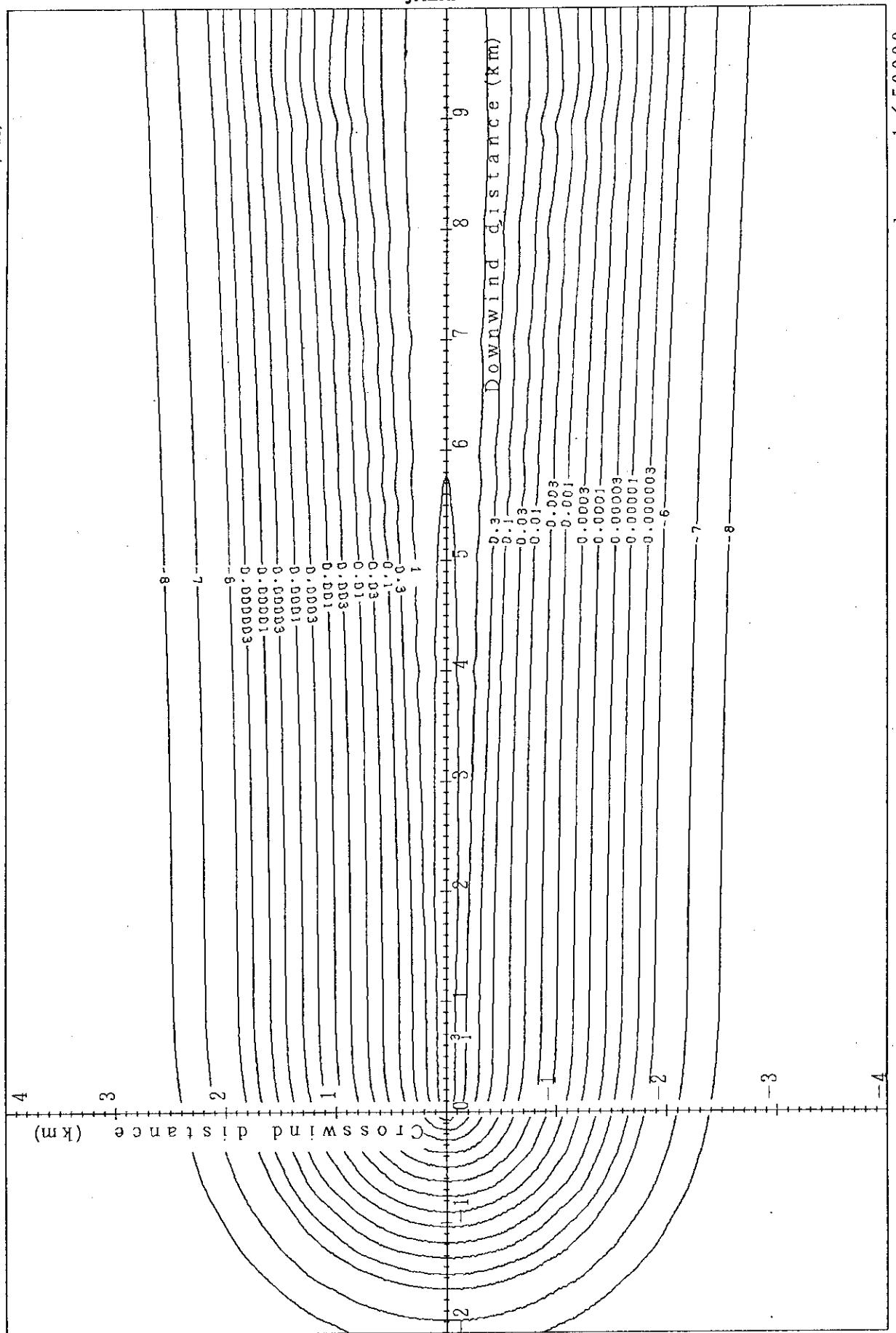
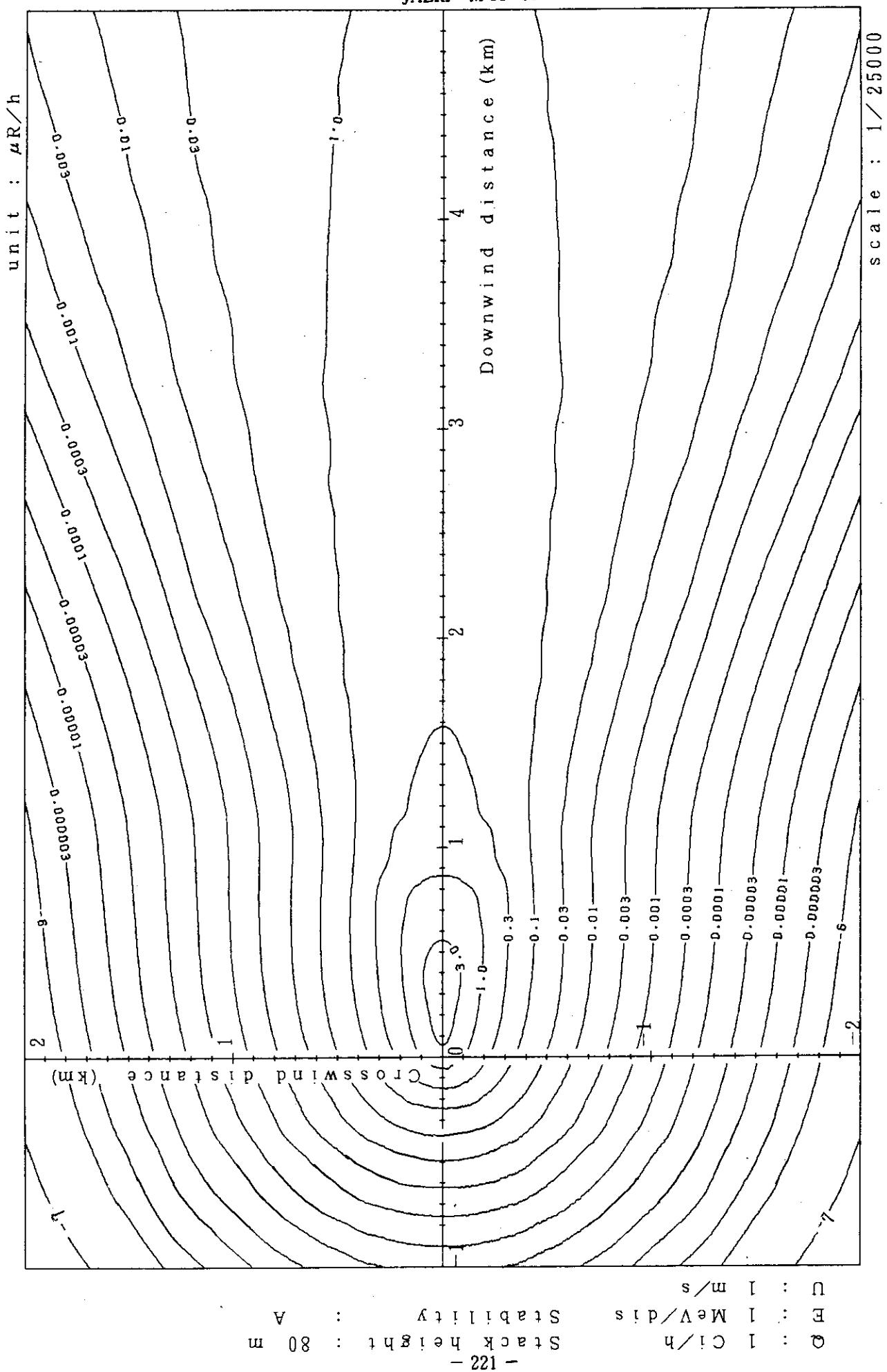
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-5-6 (B) Isopleths of surface exposure rate



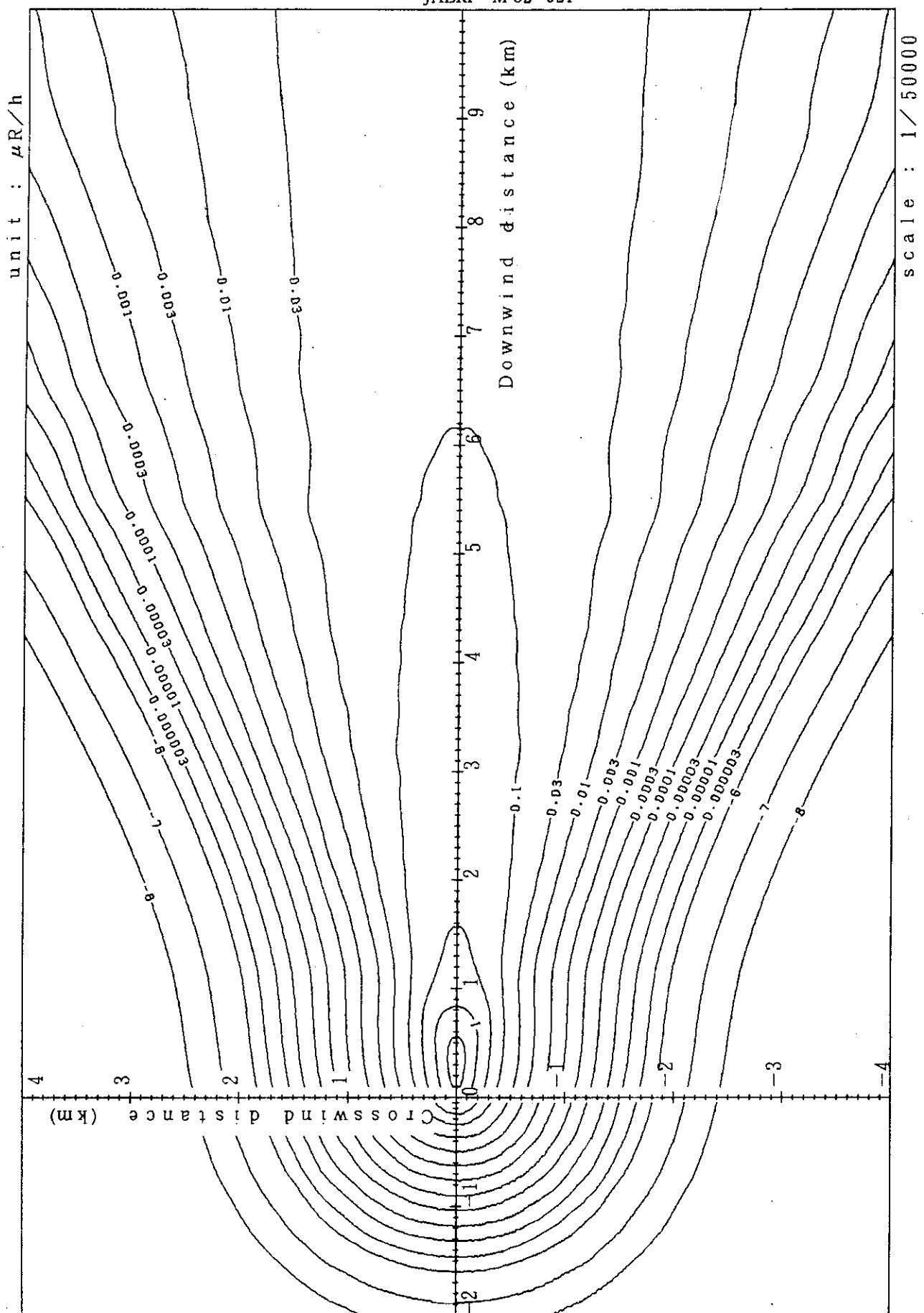


Fig. 4-6-1(B) Isopleths of surface exposure rate

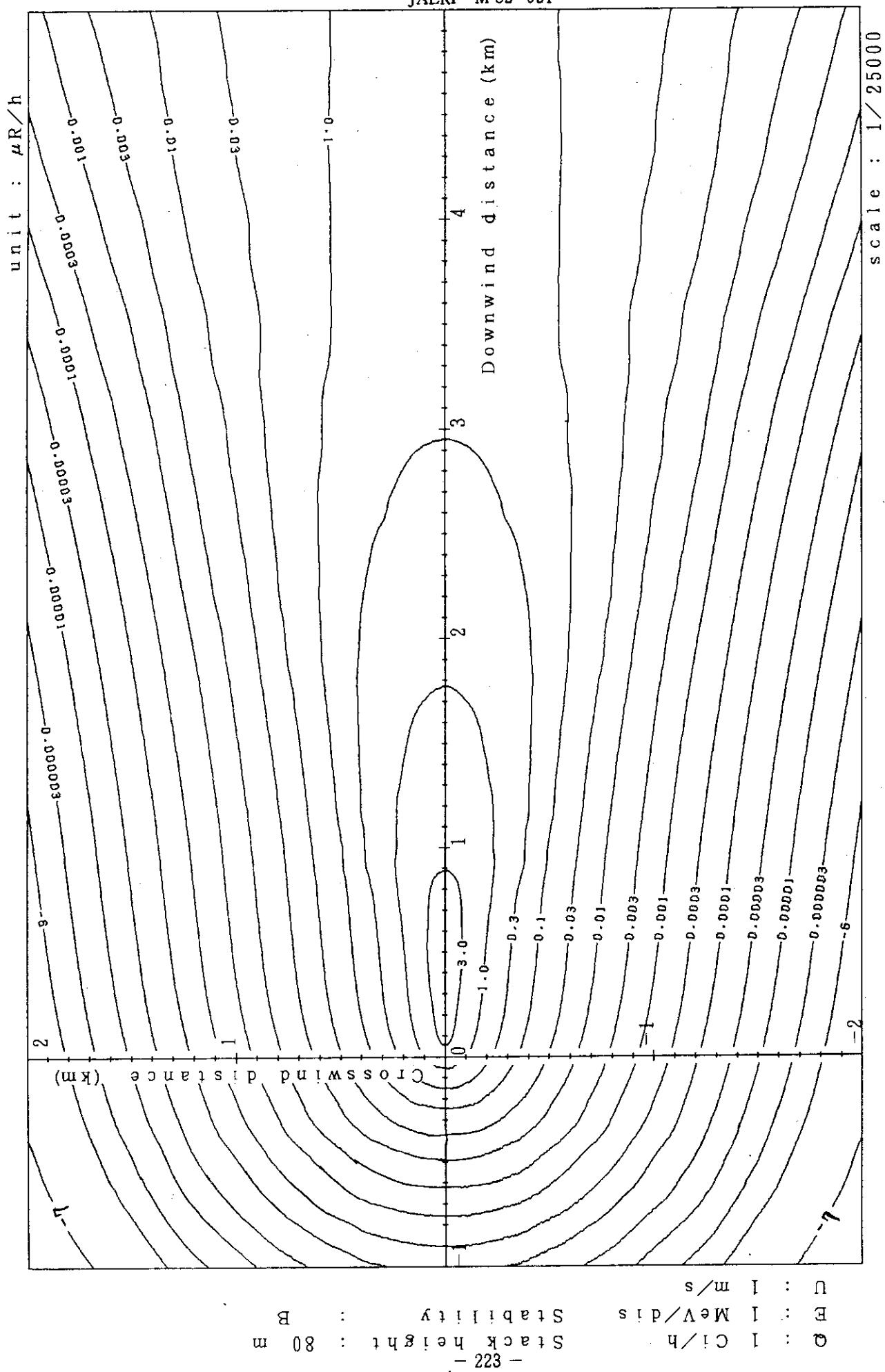


Fig. 4-6-2 (A) Isopleths of surface exposure rate

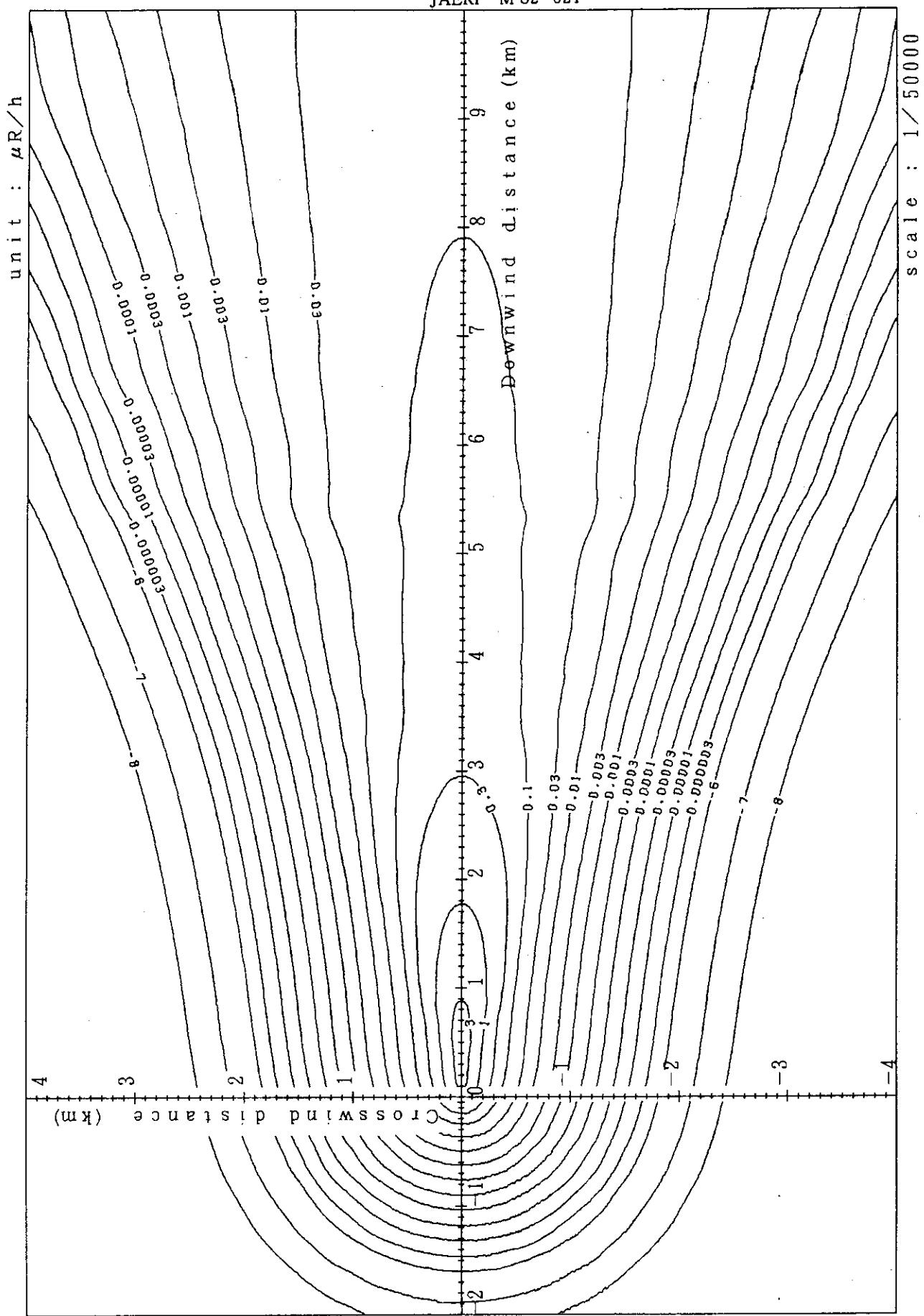


Fig. 4-6-2 (B) Isopleths of surface exposure rate

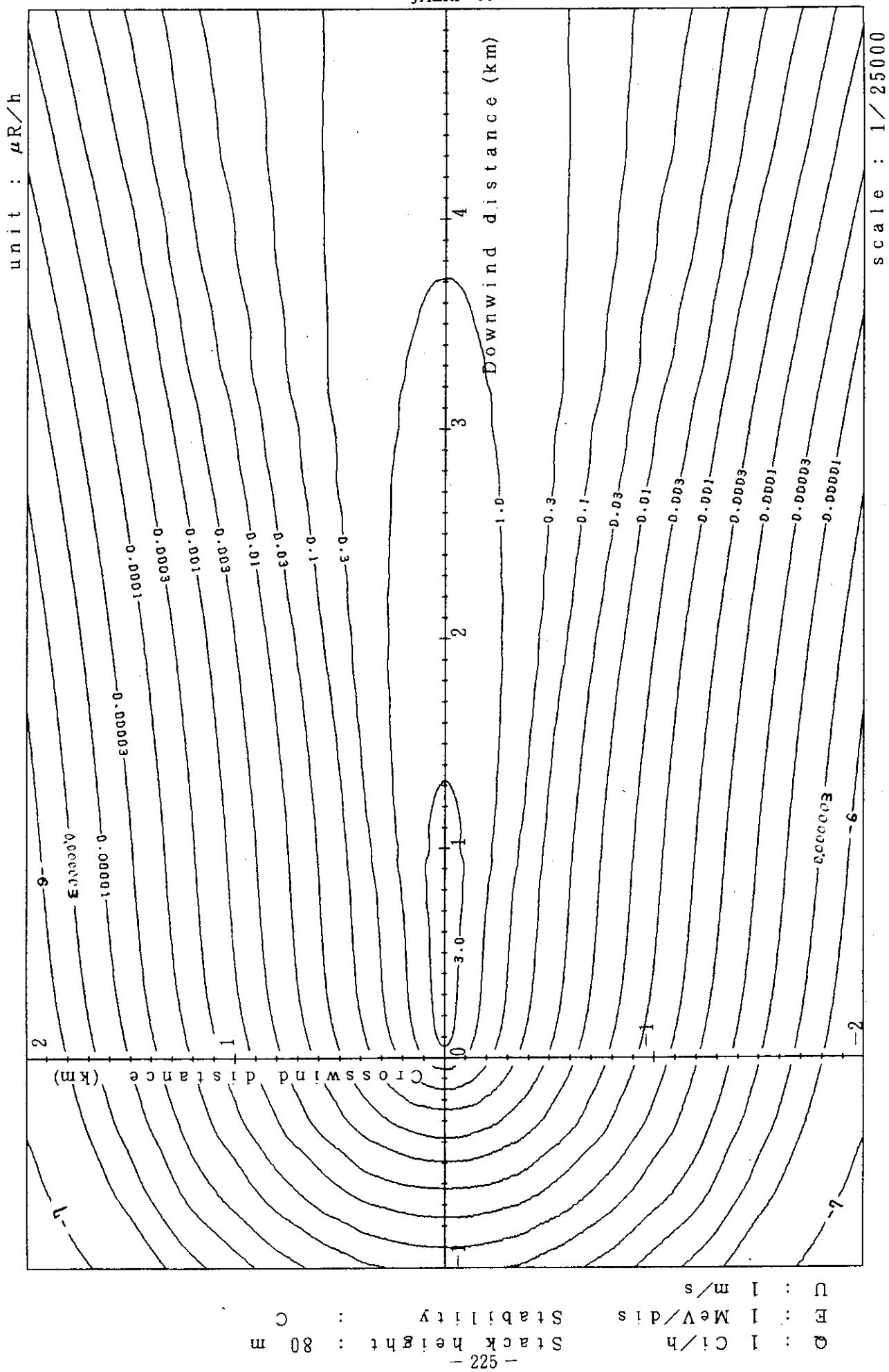


Fig. 4-6-3 (A) Isopleths of surface exposure rate

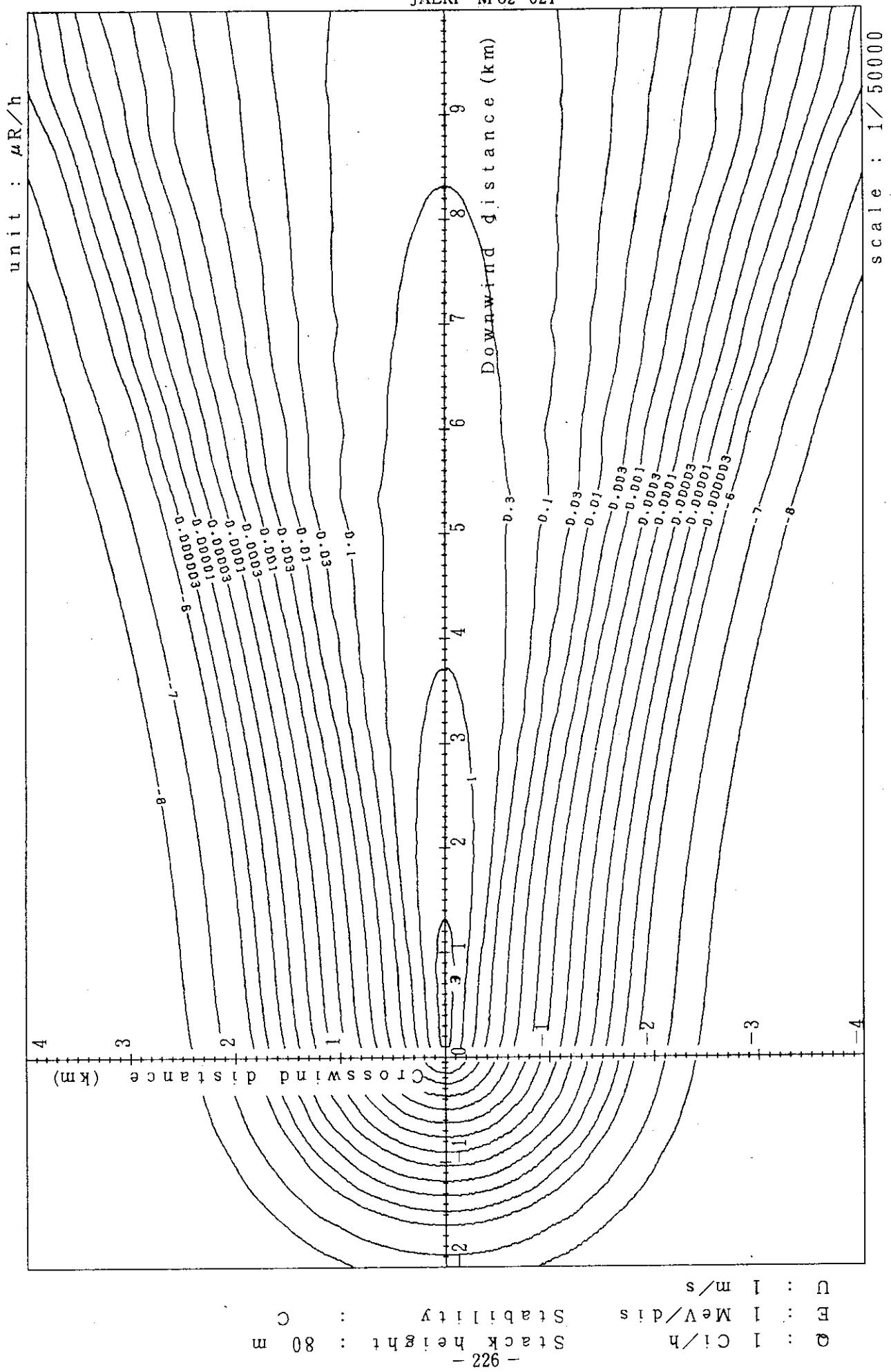


Fig. 4-6-3(B) Isopleths of surface exposure rate

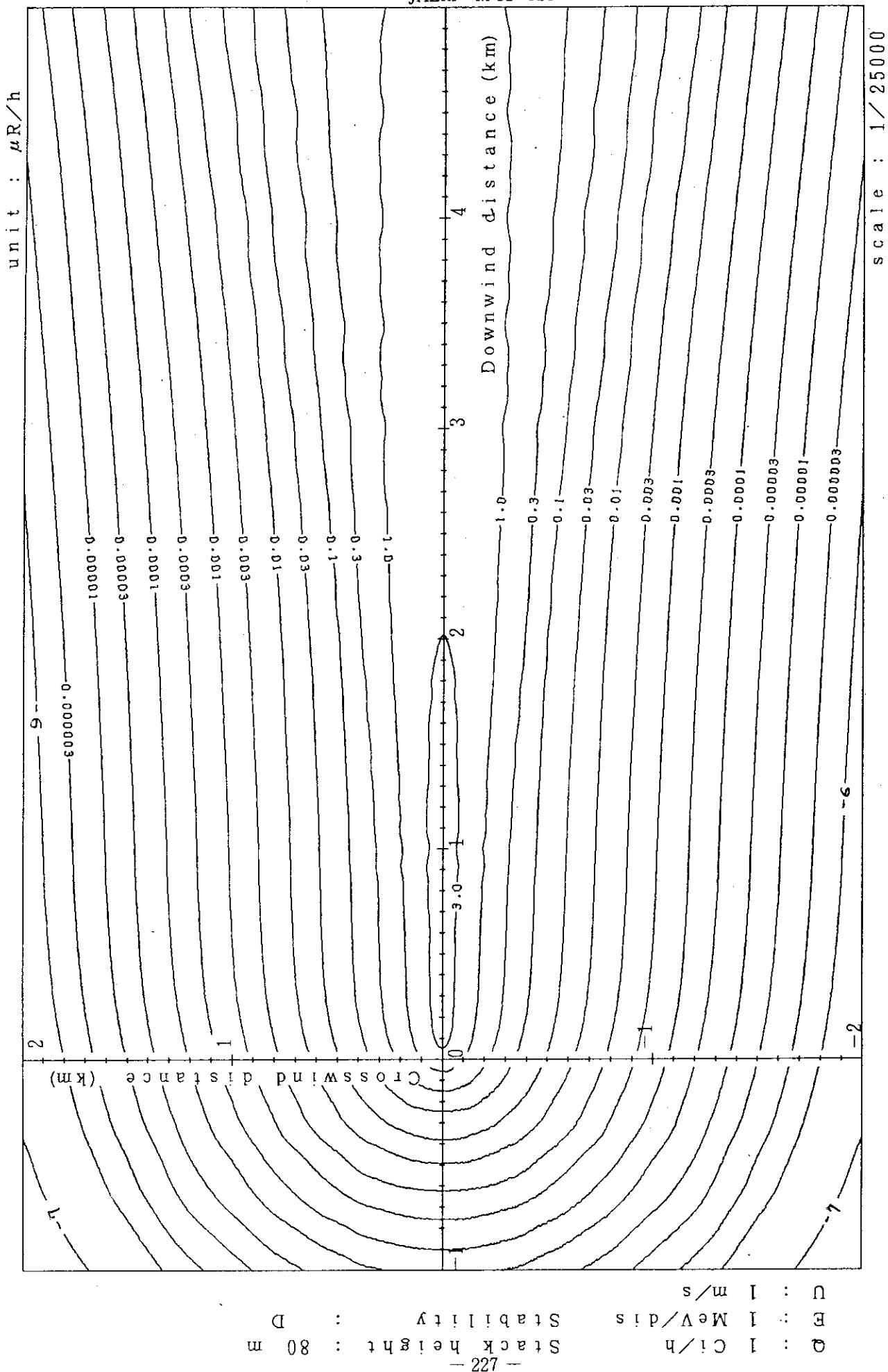
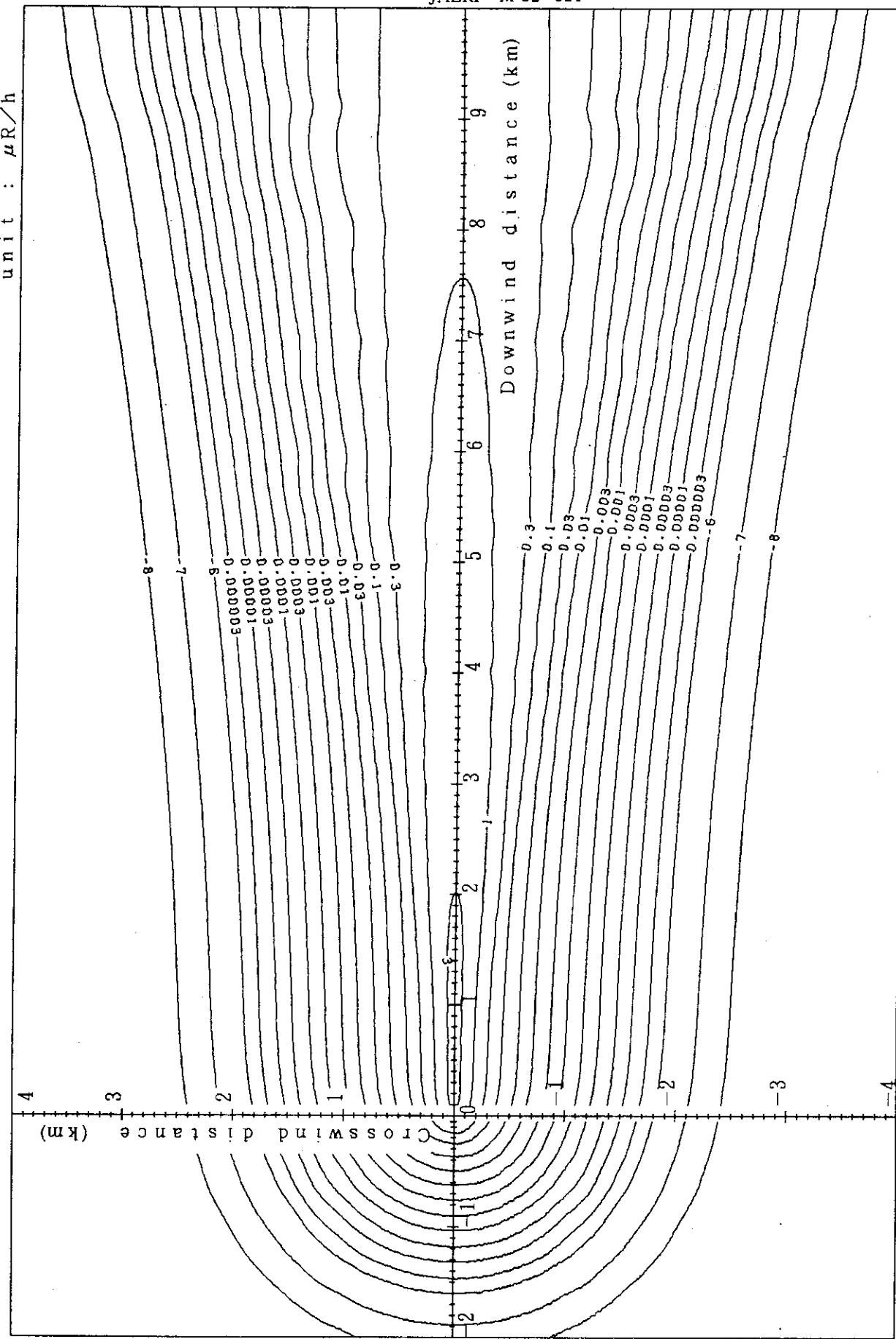


Fig. 4-6-4(A) Isopleths of surface exposure rate



D : 80 m  
 Stack height : 228 m  
 Stabili ty : 11 MeV/d<sub>is</sub>  
 Ci/h : 11 EAD

Fig. 4-6-4(B) Isopleths of surface exposure rate

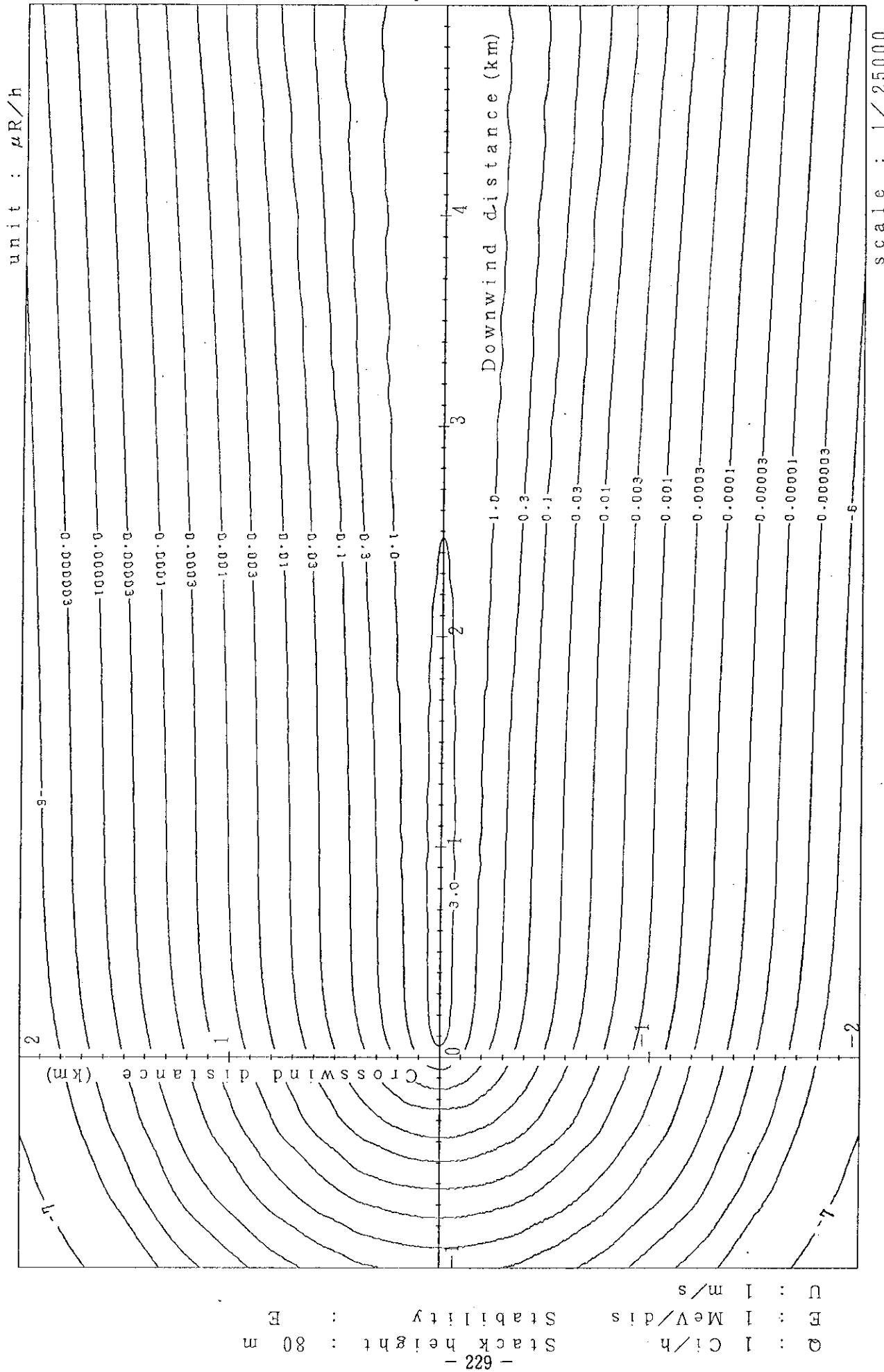


Fig. 4-6-5 (A) Isopleths of surface exposure rate

scale : 1/25000

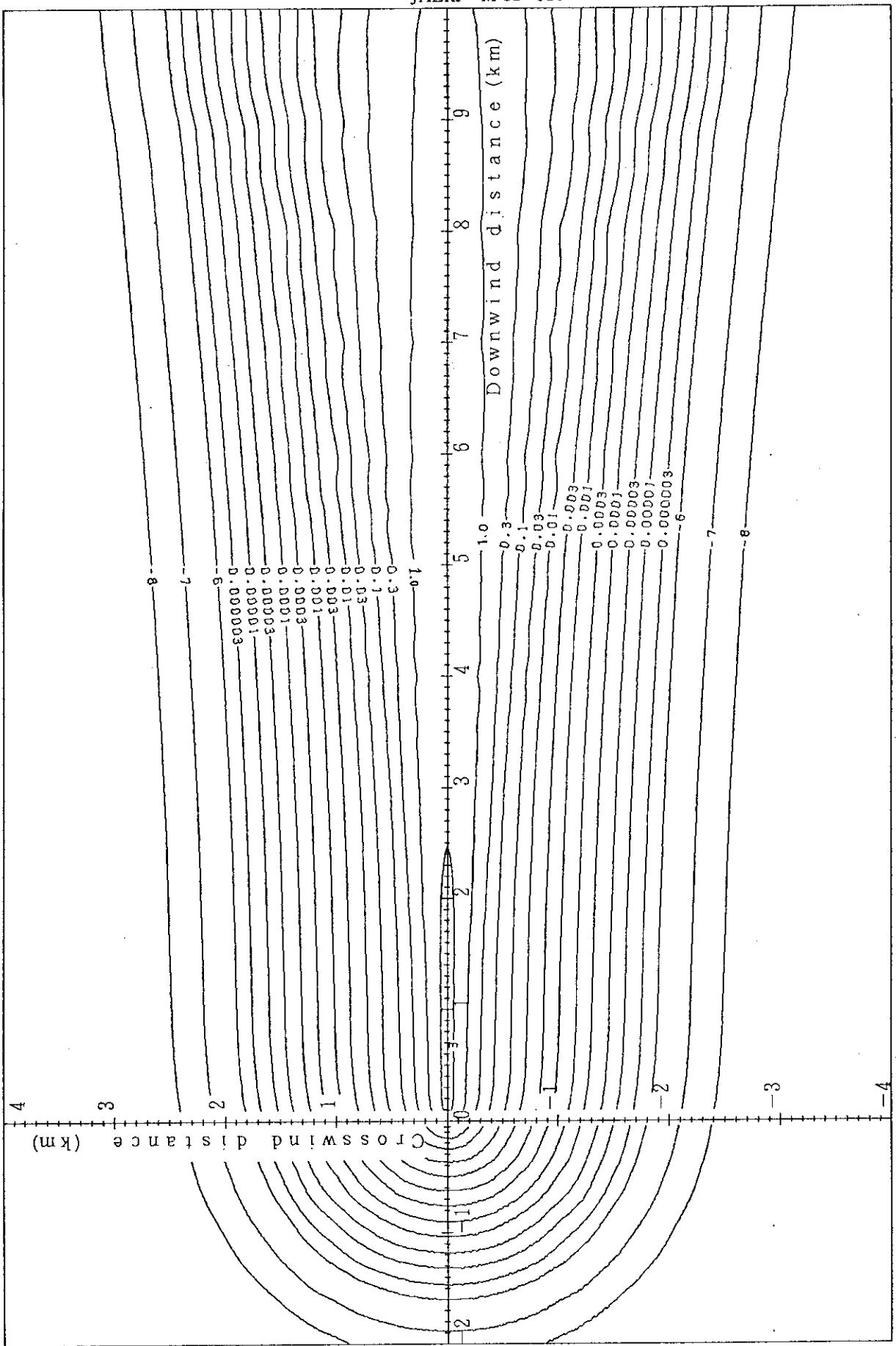
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-6-5(B) Isopleths of surface exposure rate

scale : 1/50000

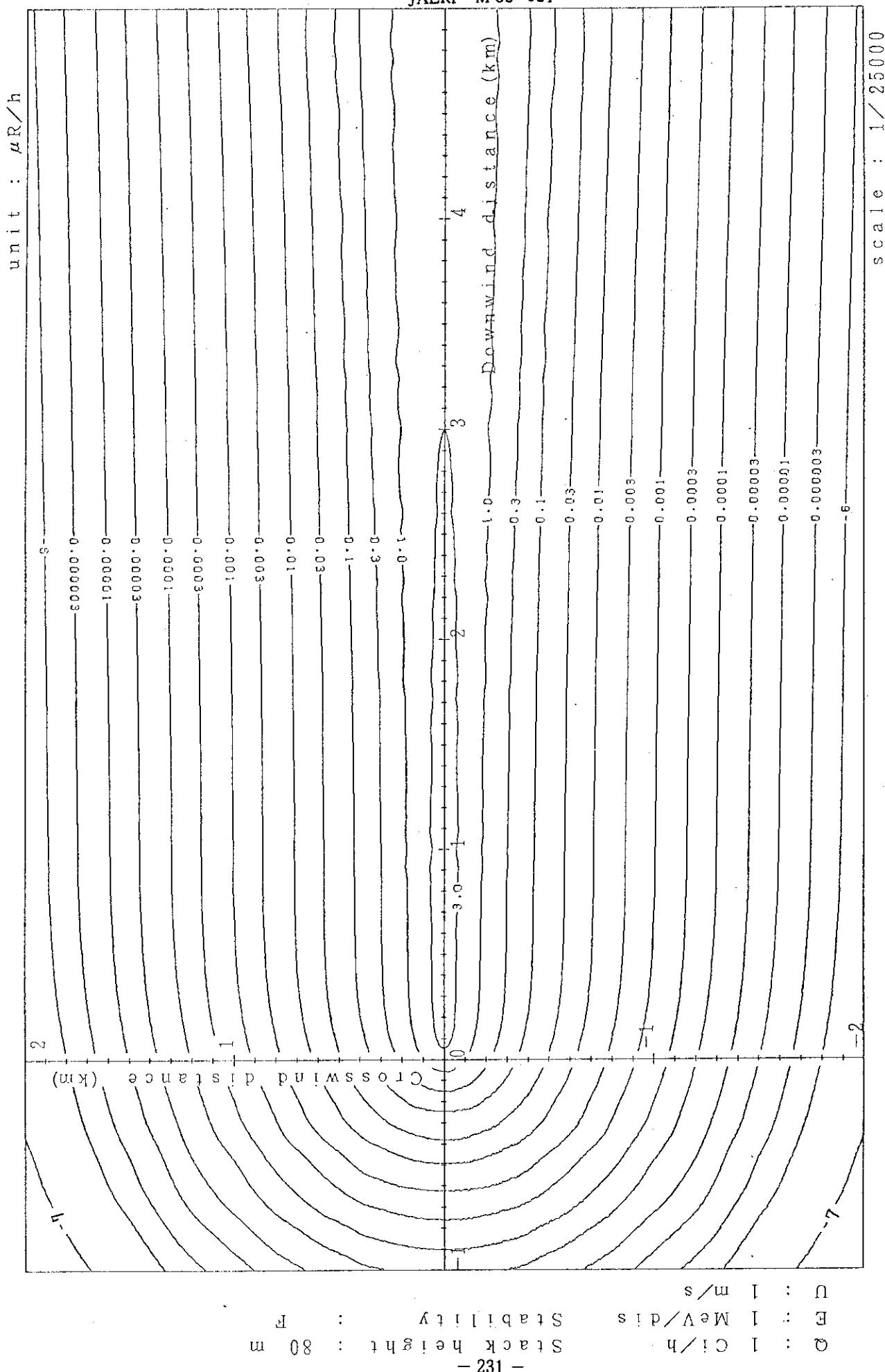


Fig. 4-6-6 (A) Isopleths of surface exposure rate

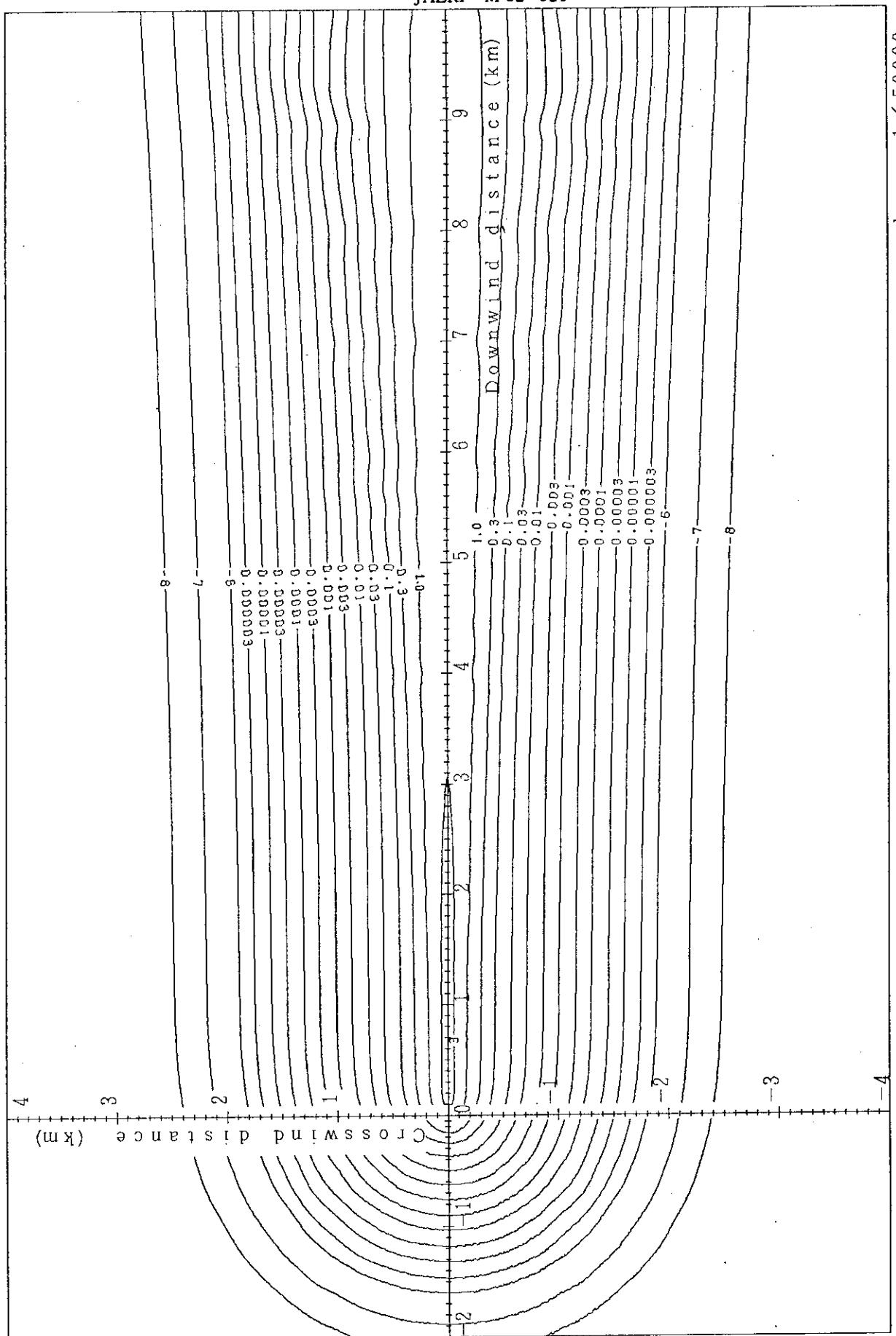
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-6-6 (B) Isopleths of surface exposure rate

scale : 1/50000

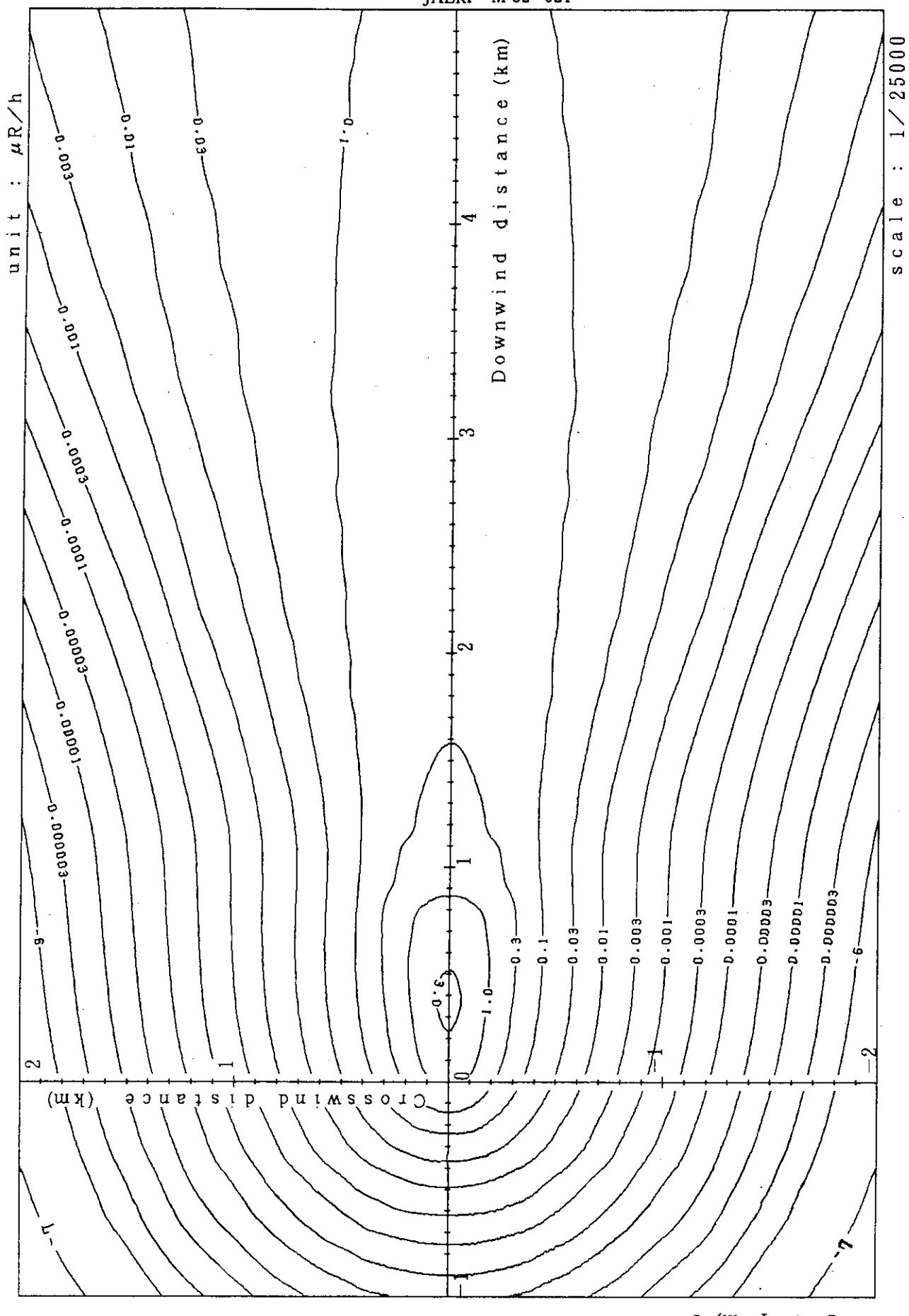


Fig. 4-7-1 (A) Isopleths of surface exposure rate

$Q$  : 1 Ci/h       $E$  : 1 MeV/dis       $H$  : 1 m       $U$  : 1 m/s  
 Stack height : 100 m      Stability : A

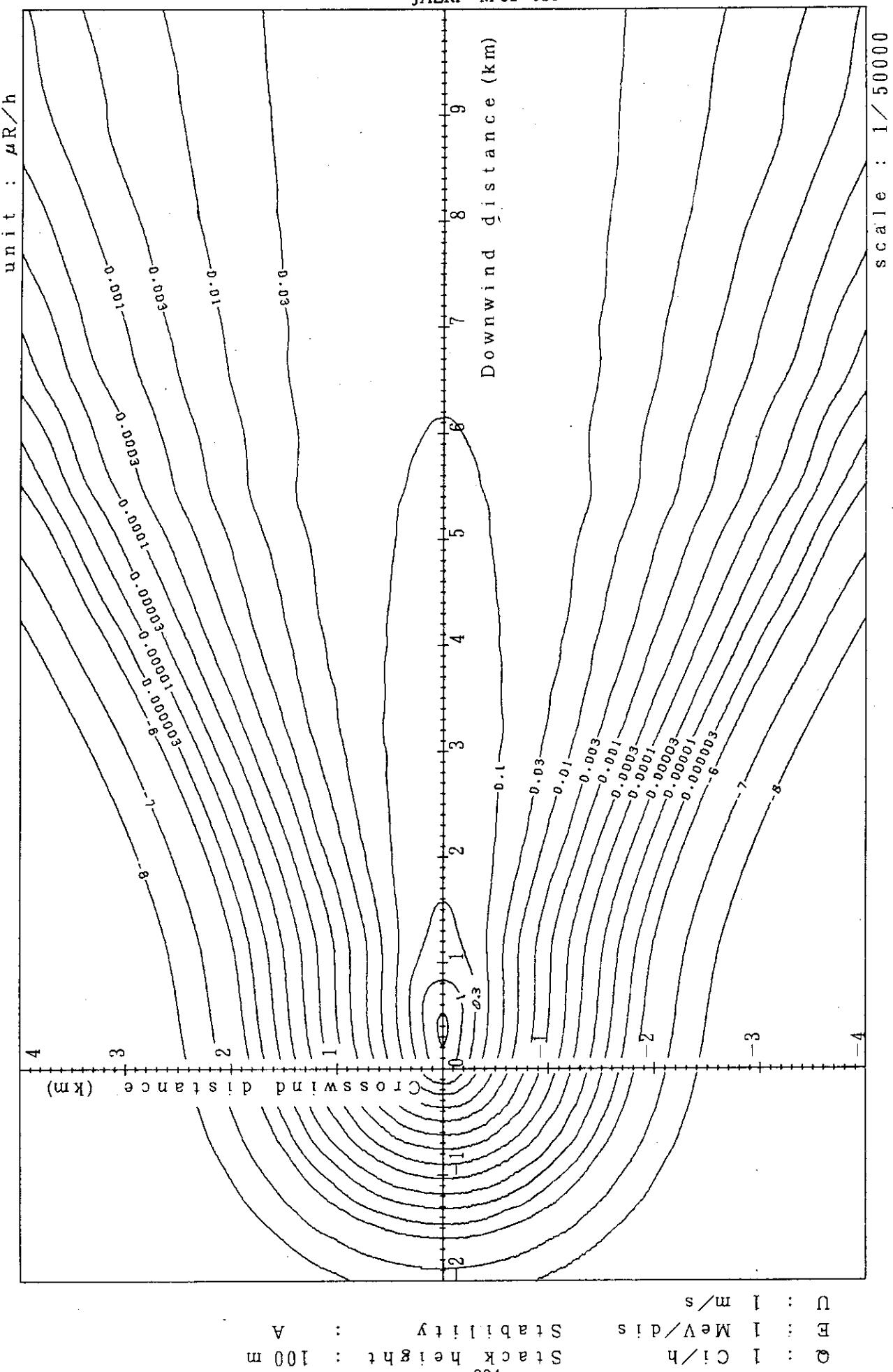


Fig. 4-7-1(B) Isopleths of surface exposure rate

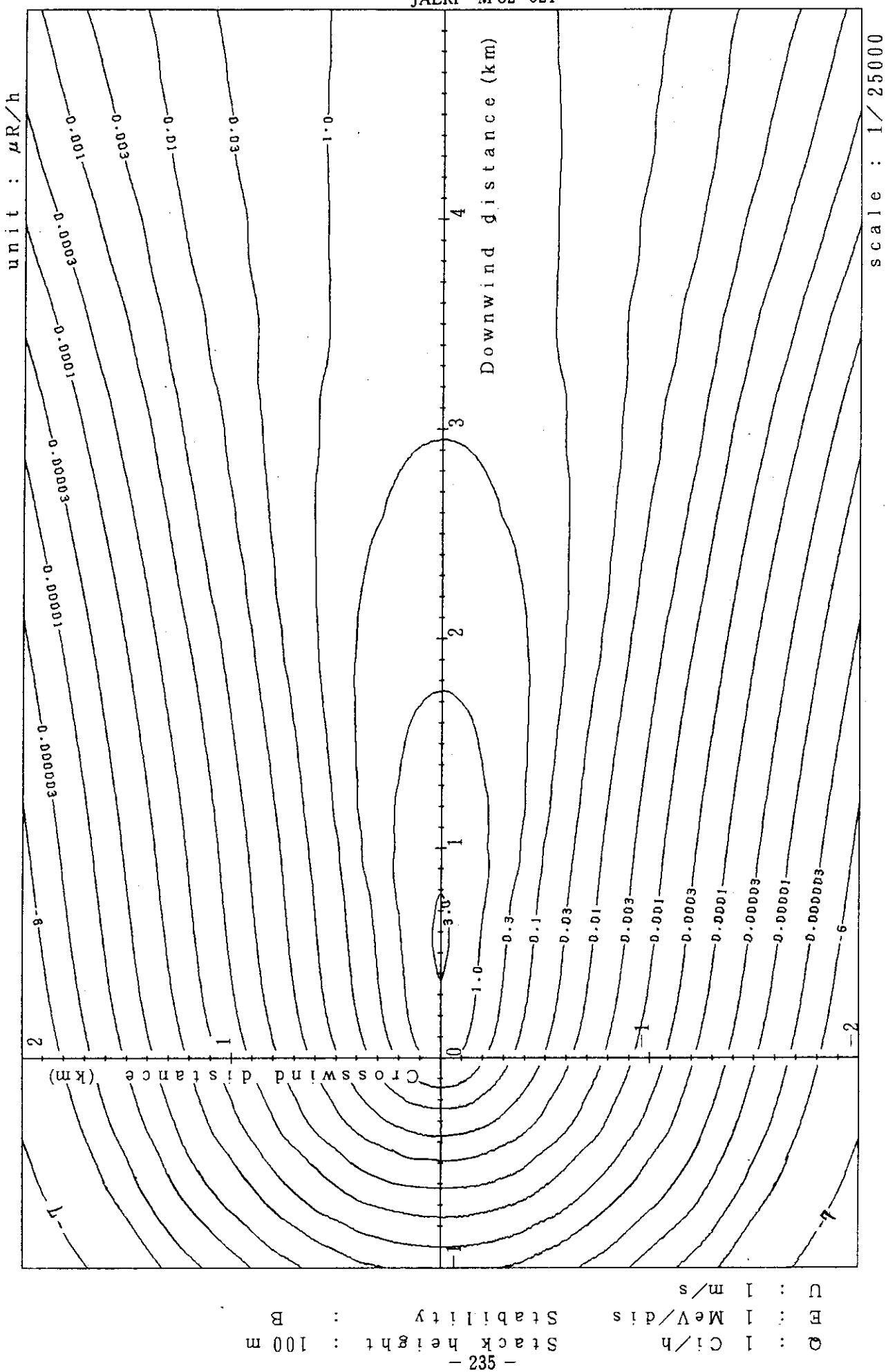


Fig. 4-7-2 (A) Isopleths of surface exposure rate

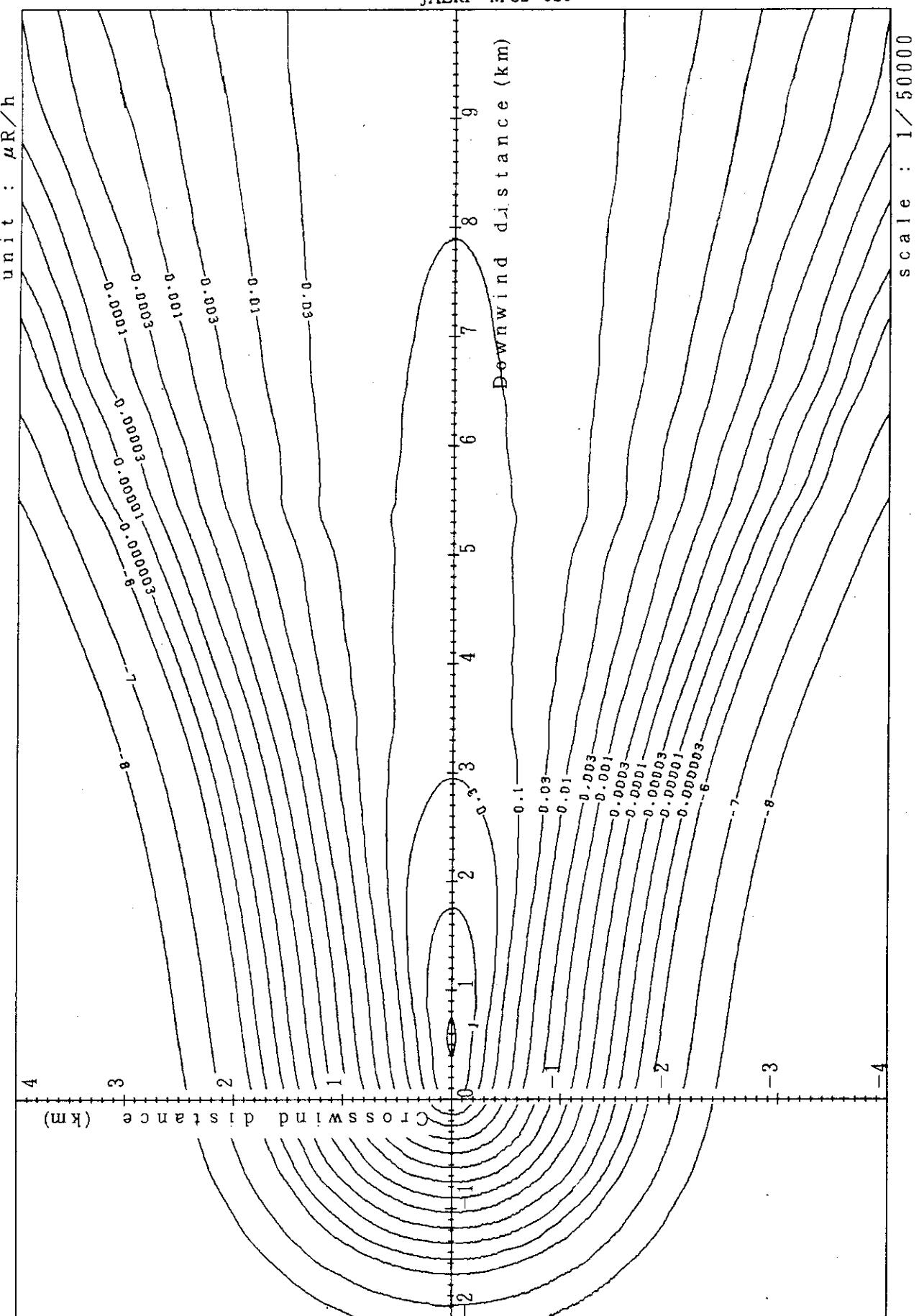


Fig. 4-7-2 (B) Isopleths of surface exposure rate

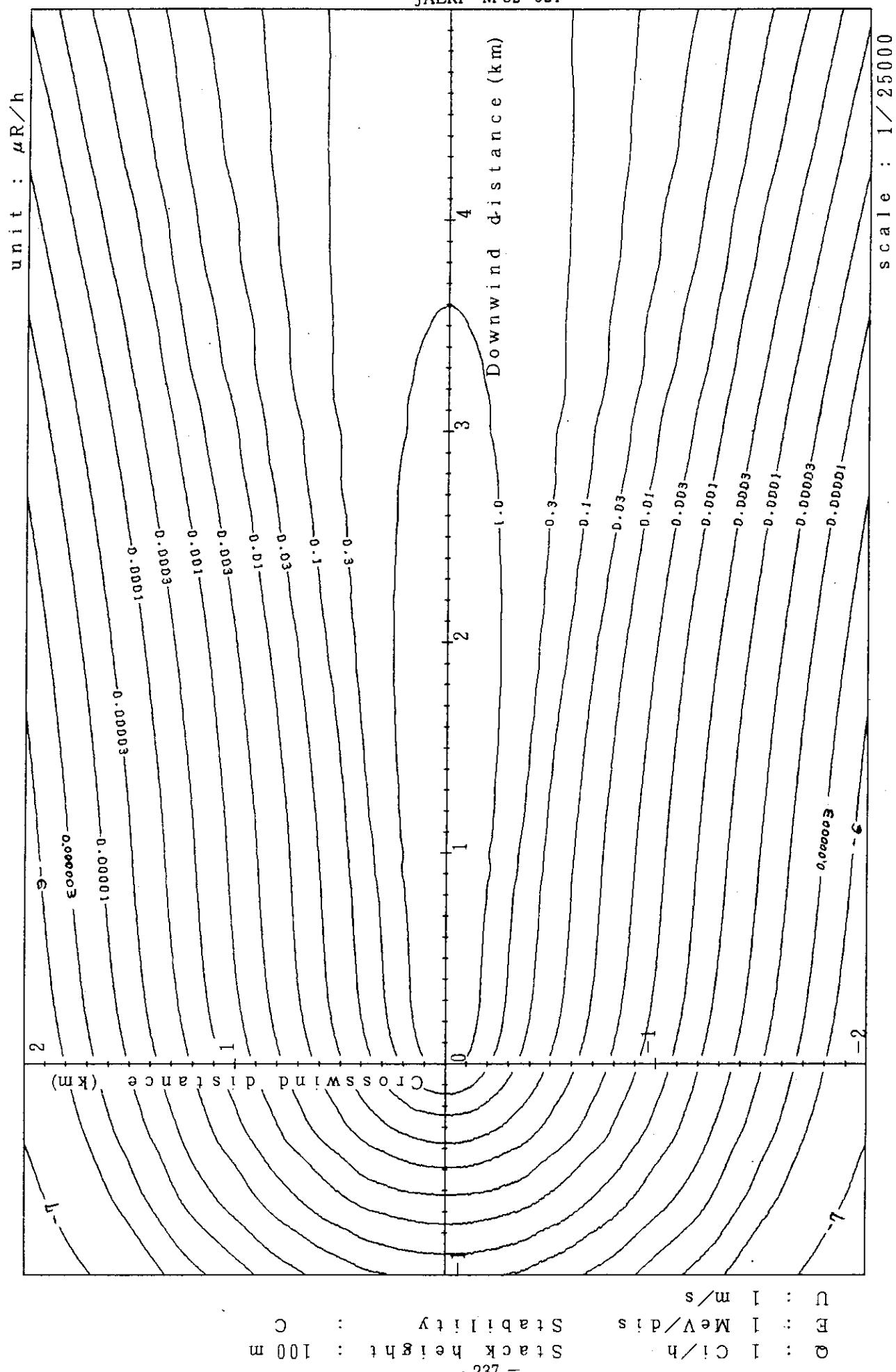


Fig. 4-7-3 (A) Isopleths of surface exposure rate

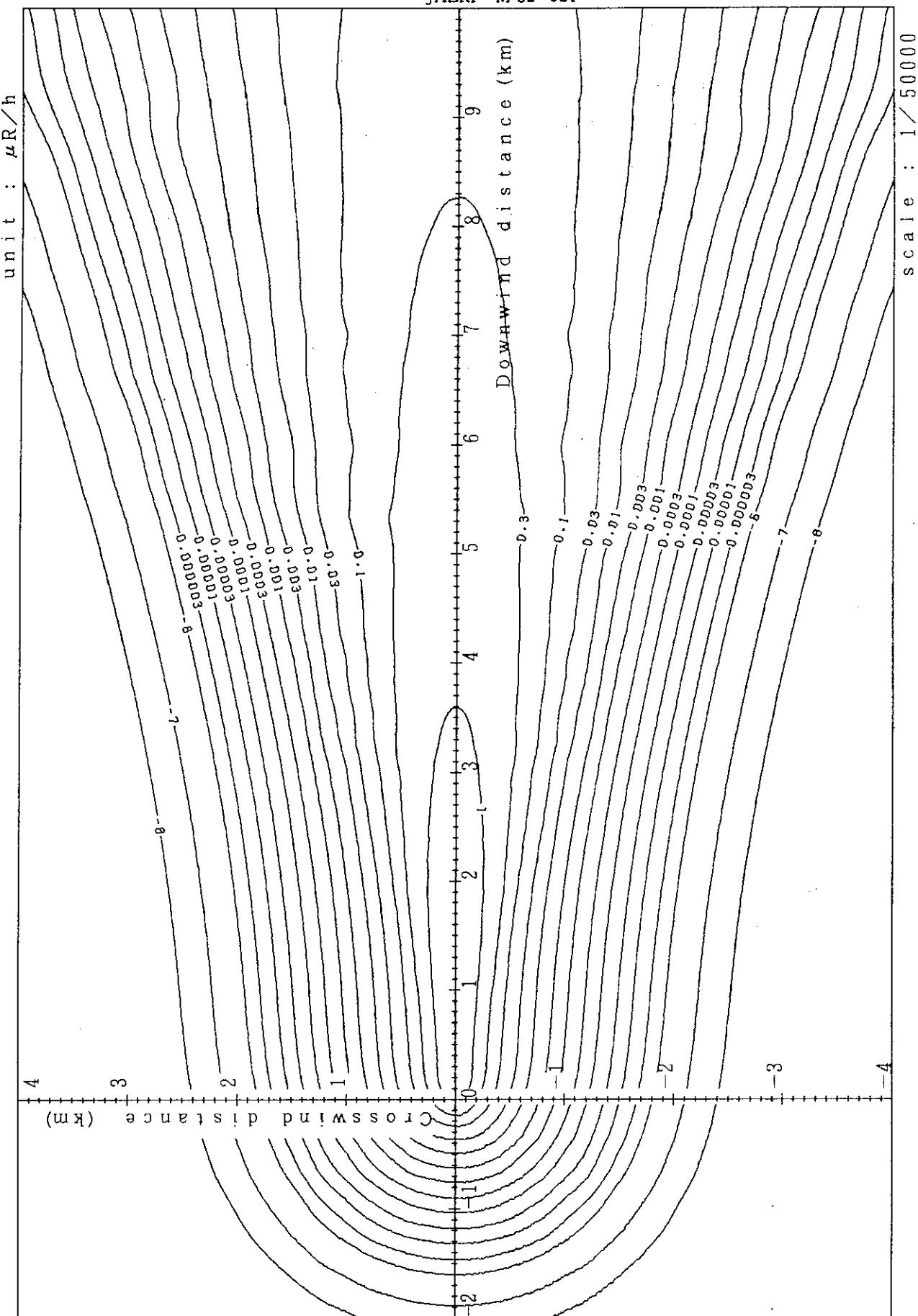


Fig. 4-7-3 (B) Isopleths of surface exposure rate

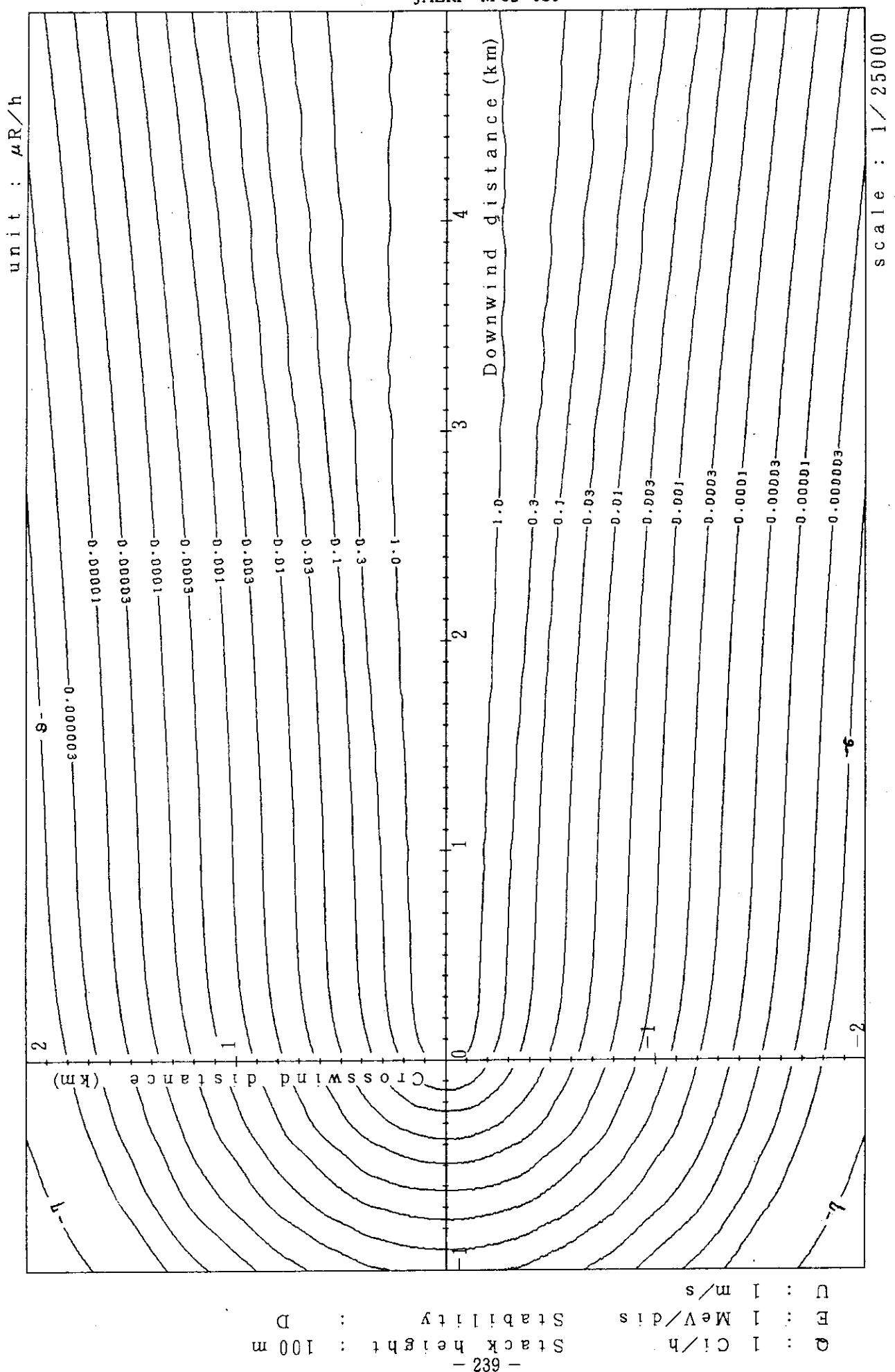


Fig. 4-7-4 (A) Isopleths of surface exposure rate

Stack height : 100 m

$Q : 1 \text{ C}1/\text{h}$   
 $E : 1 \text{ MeV/di s}$   
 $U : 1 \text{ m/s}$

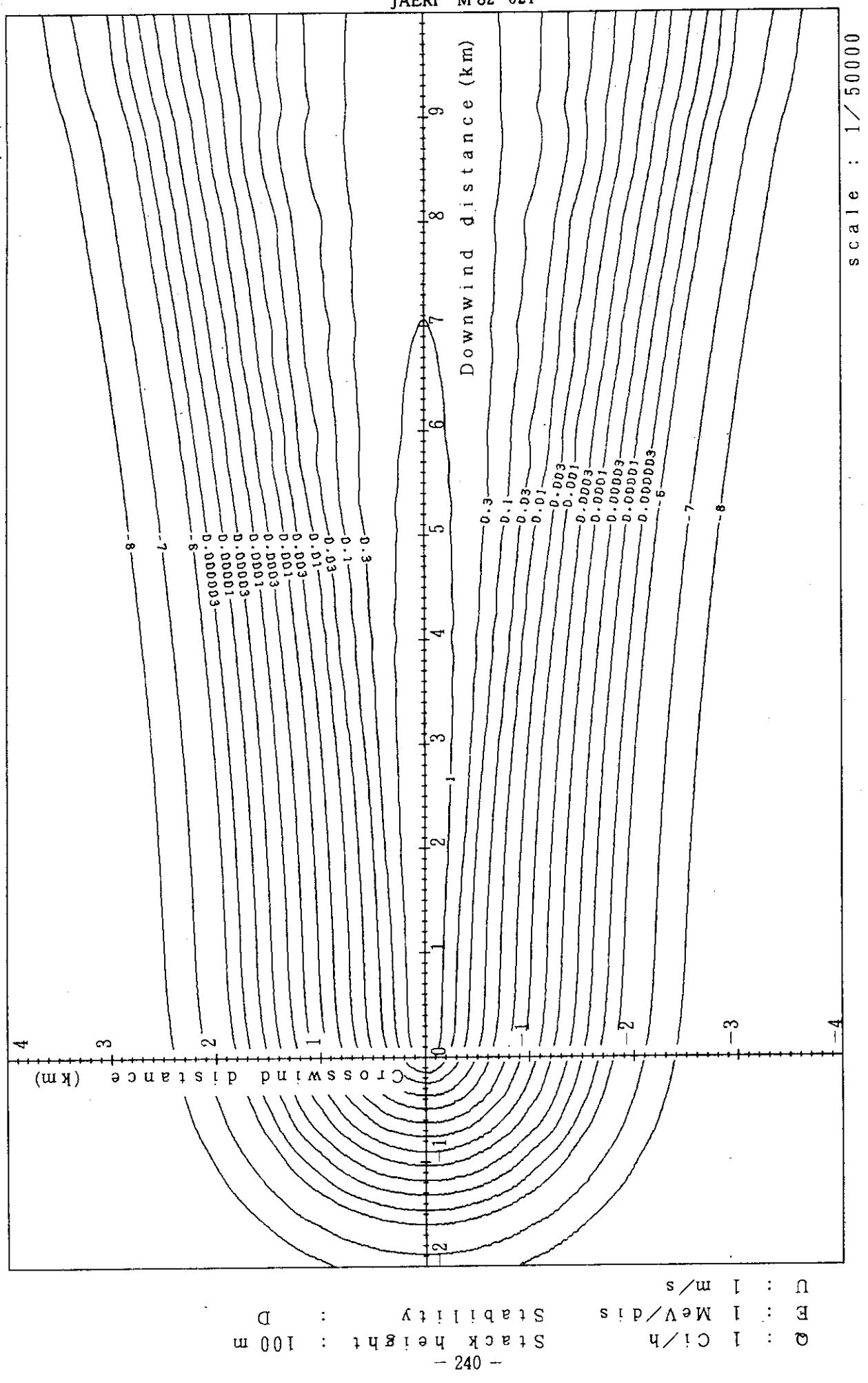


Fig. 4-7-4(B) Isopleths of surface exposure rate

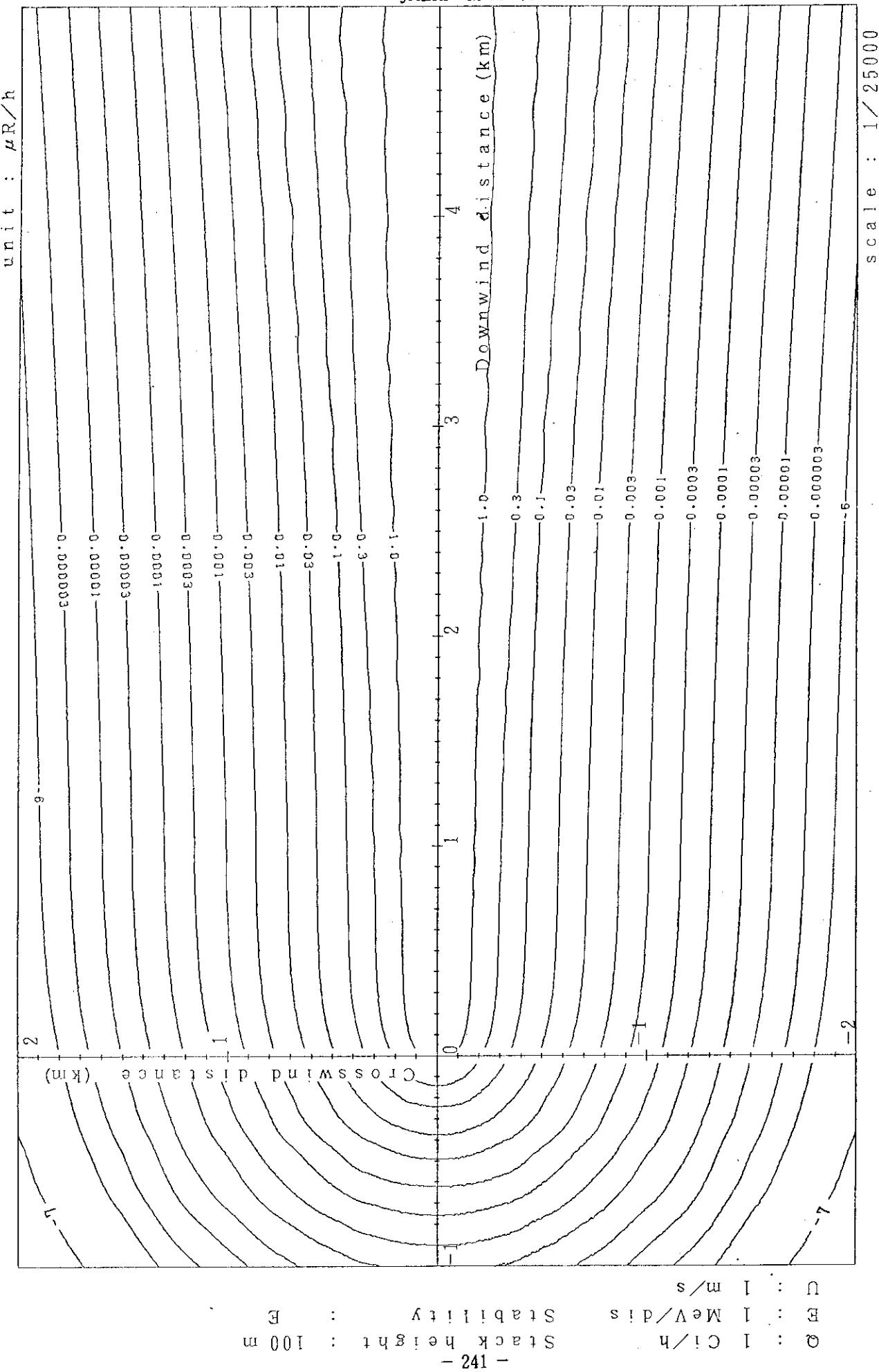


Fig. 4-7-5 (A) Isopleths of surface exposure rate

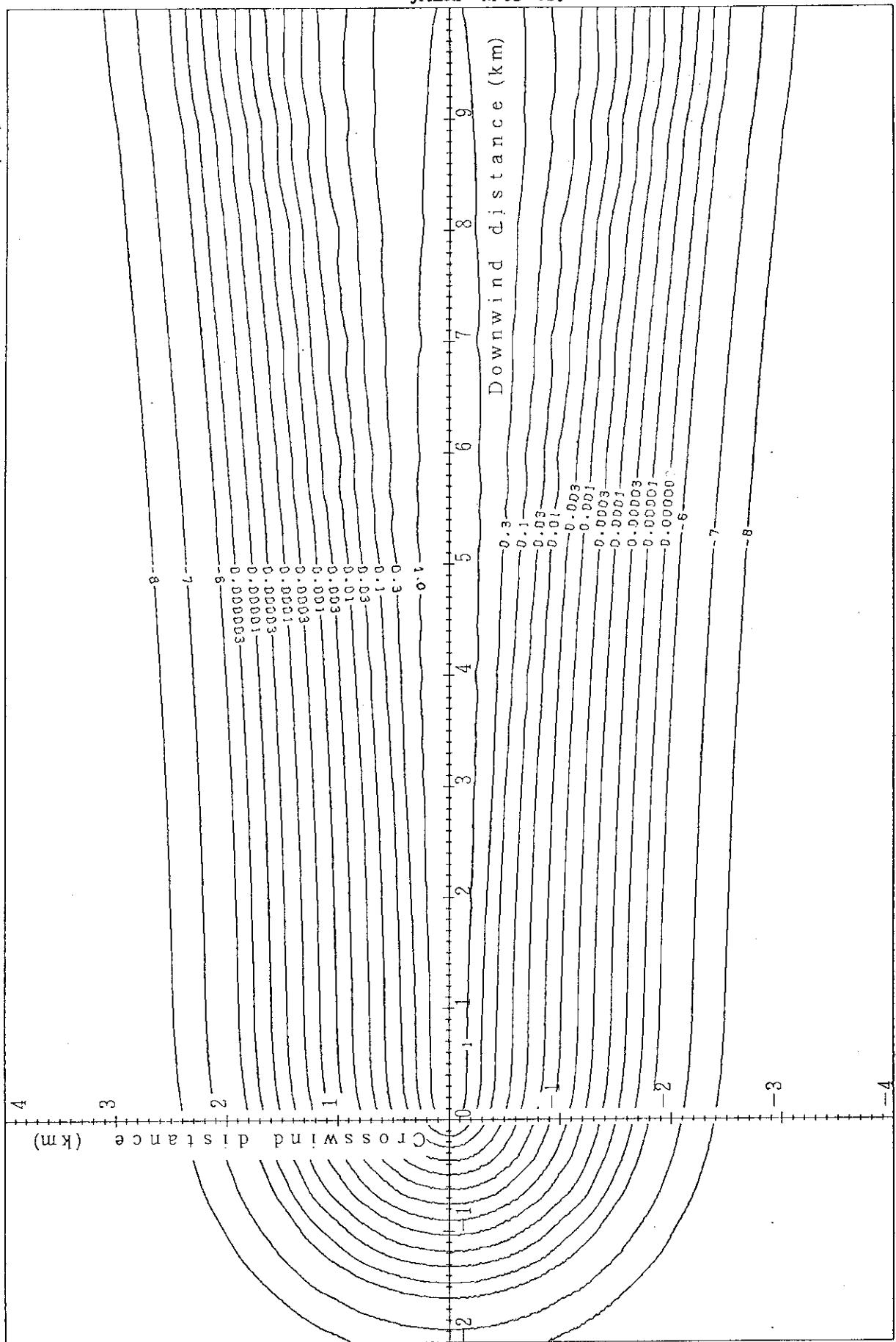
unit :  $\mu\text{R/h}$ 

Fig. 4-7-5 (B) Isopleths of surface exposure rate

scale : 1/50000

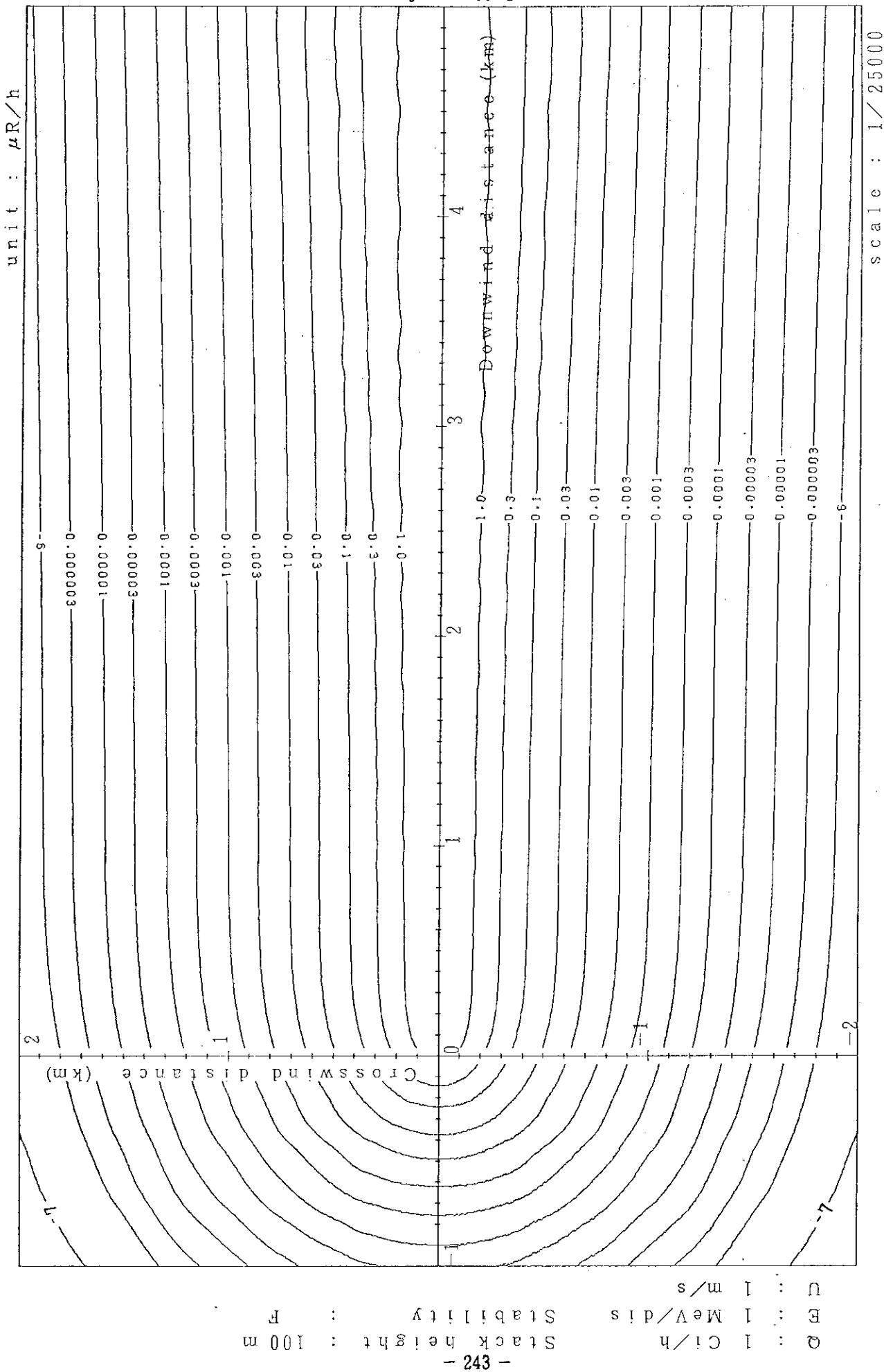


Fig. 4-7-6 (A) Isopleths of surface exposure rate

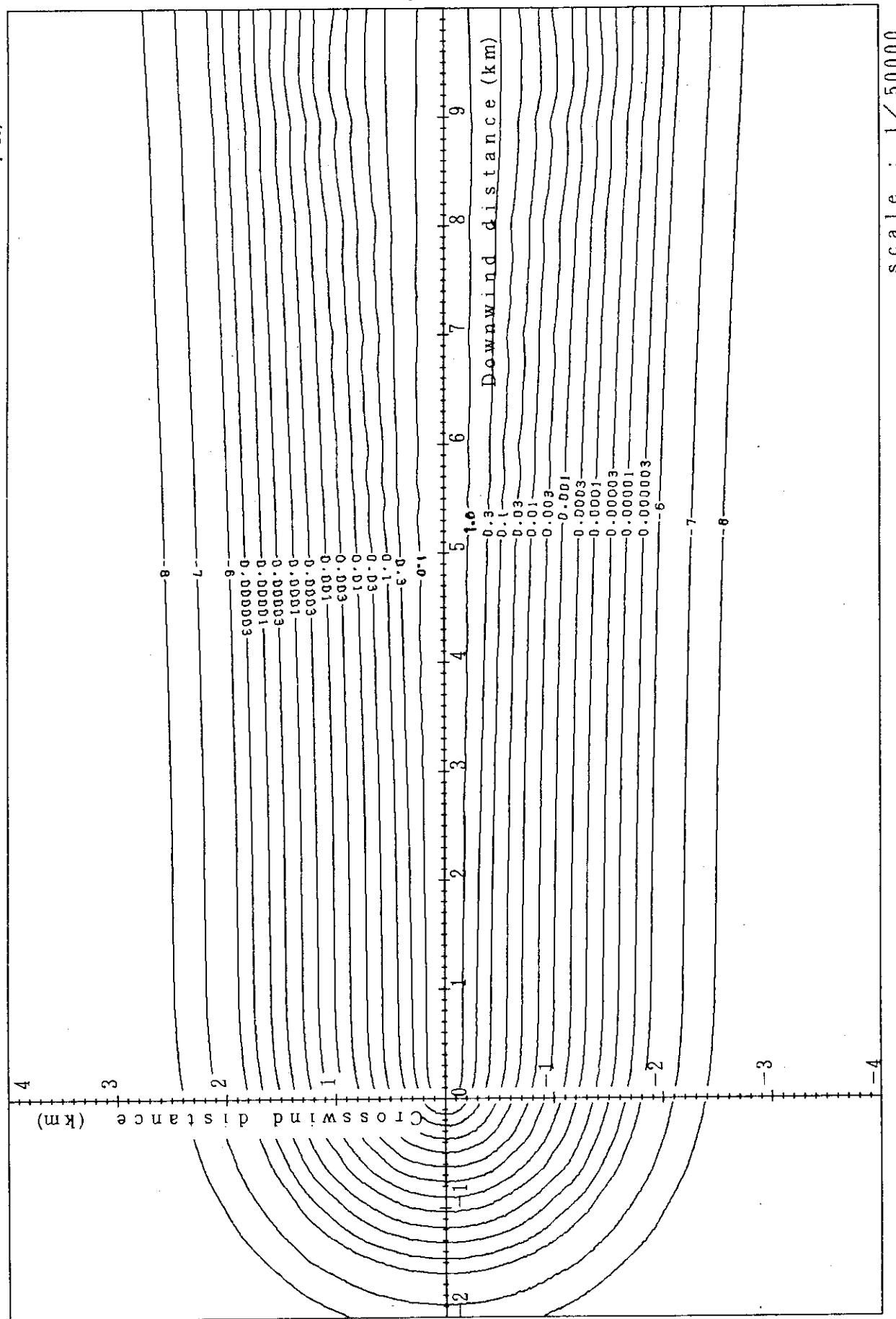
unit :  $\mu\text{R/h}$ 

Fig. 4-7-6 (B) Isopleths of surface exposure rate

scale : 1/50000

CD : 1 MeV/d<sub>is</sub>  
 : 1 Ci/h Stacking height : 100 m  
 -244-

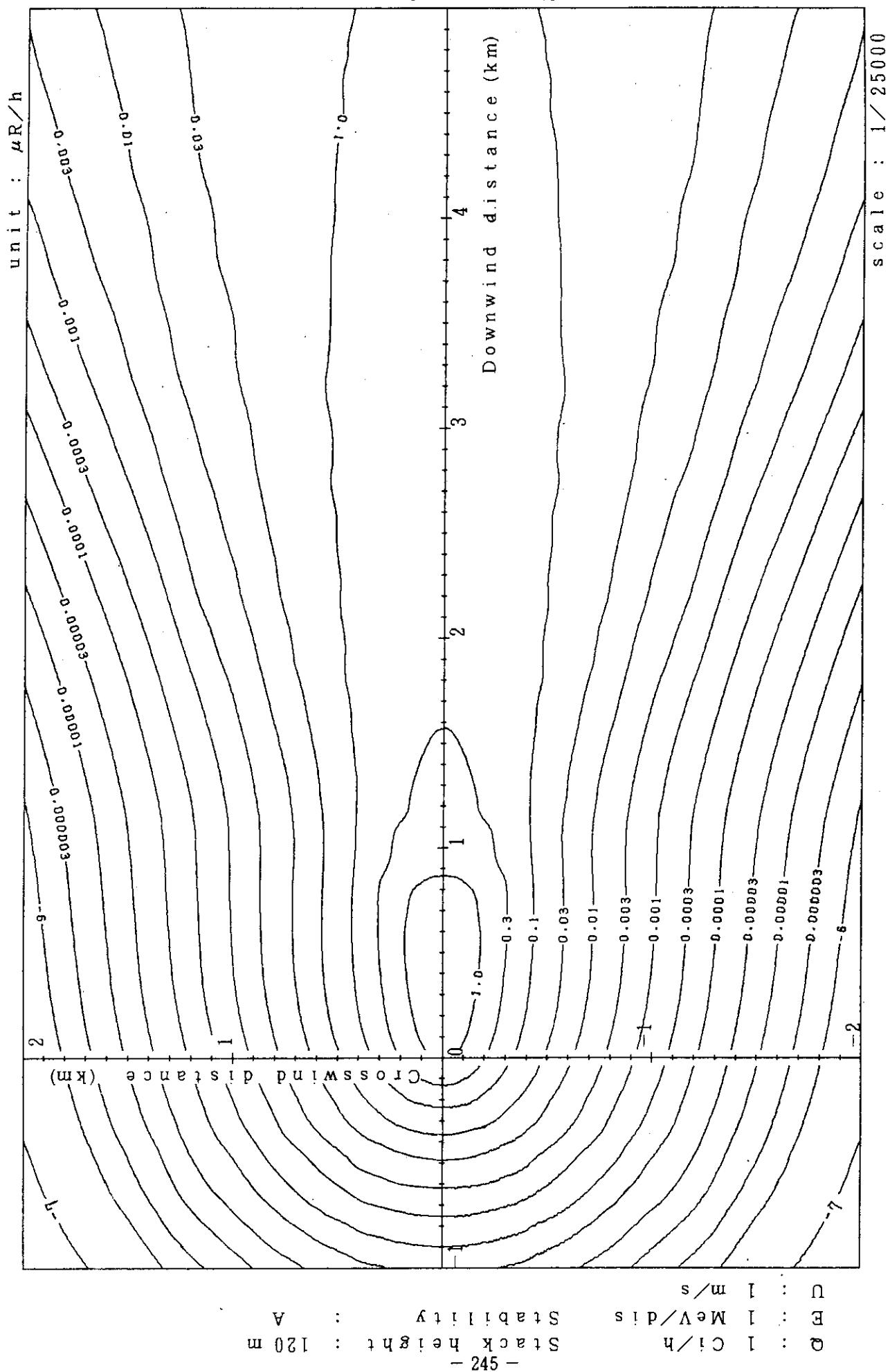


Fig. 4-8-1(A) Isopleths of surface exposure rate

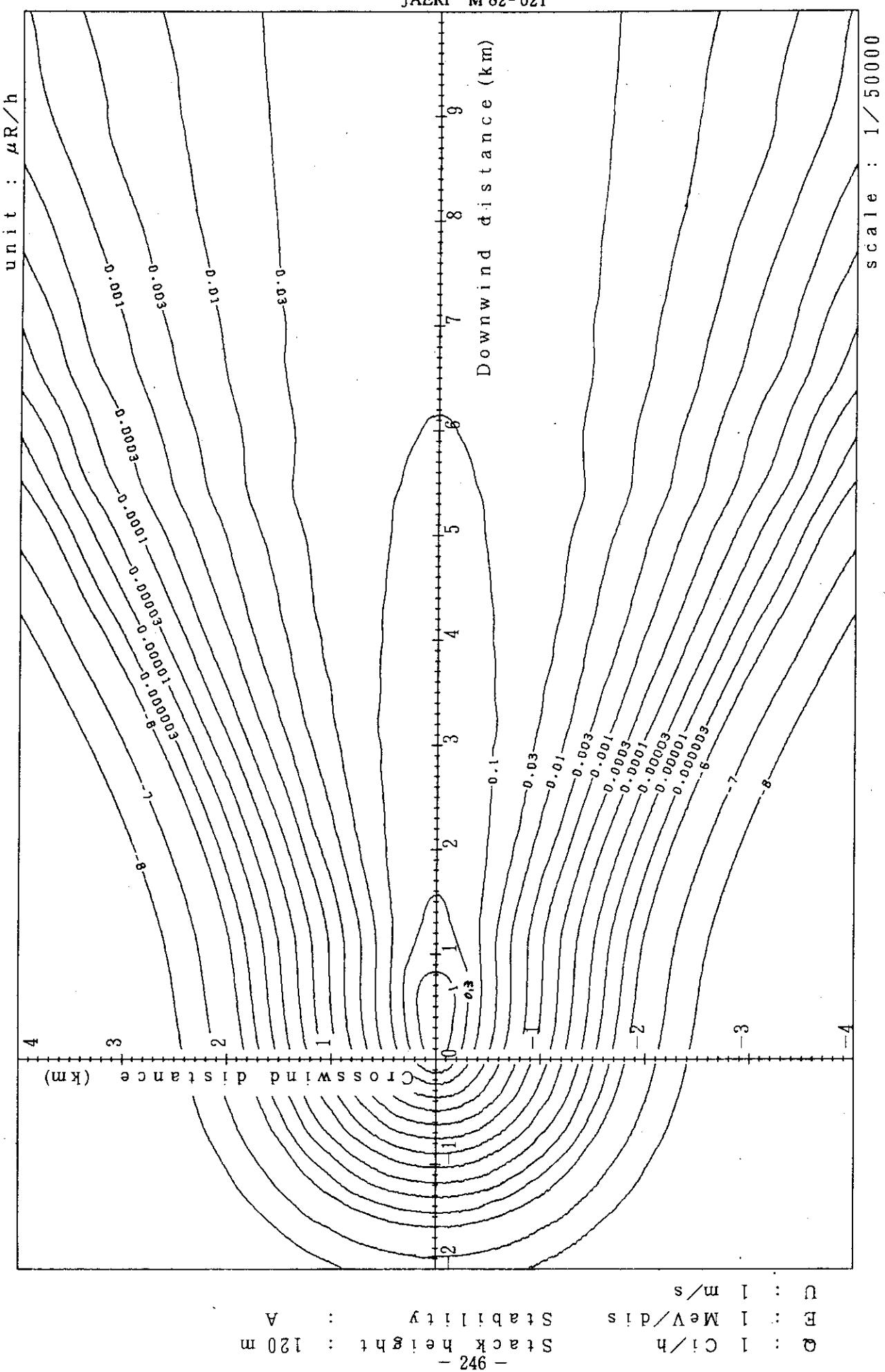


Fig. 4-8-1(B) Isopleths of surface exposure rate

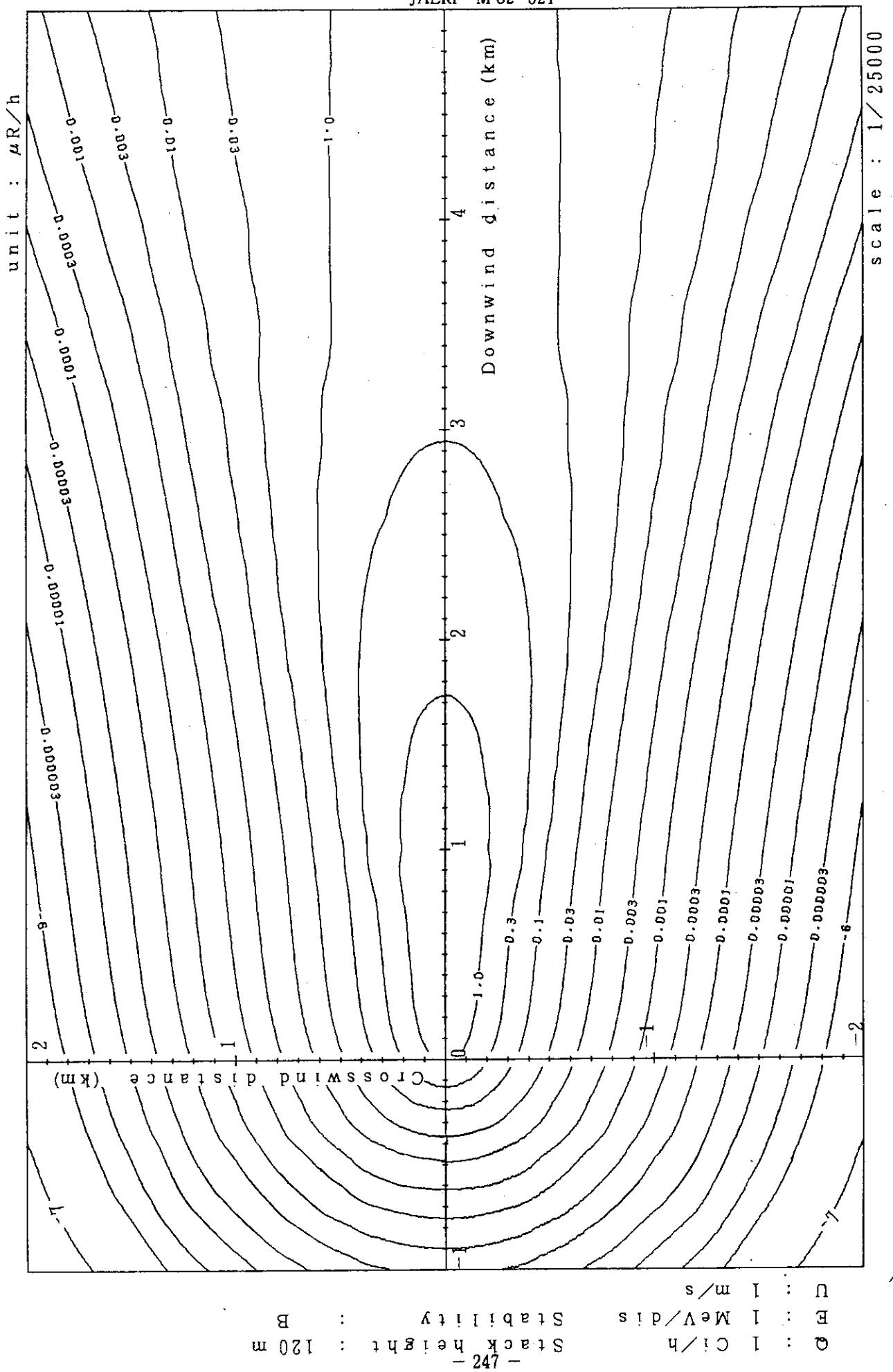


Fig. 4-8-2 (A) Isopleths of surface exposure rate

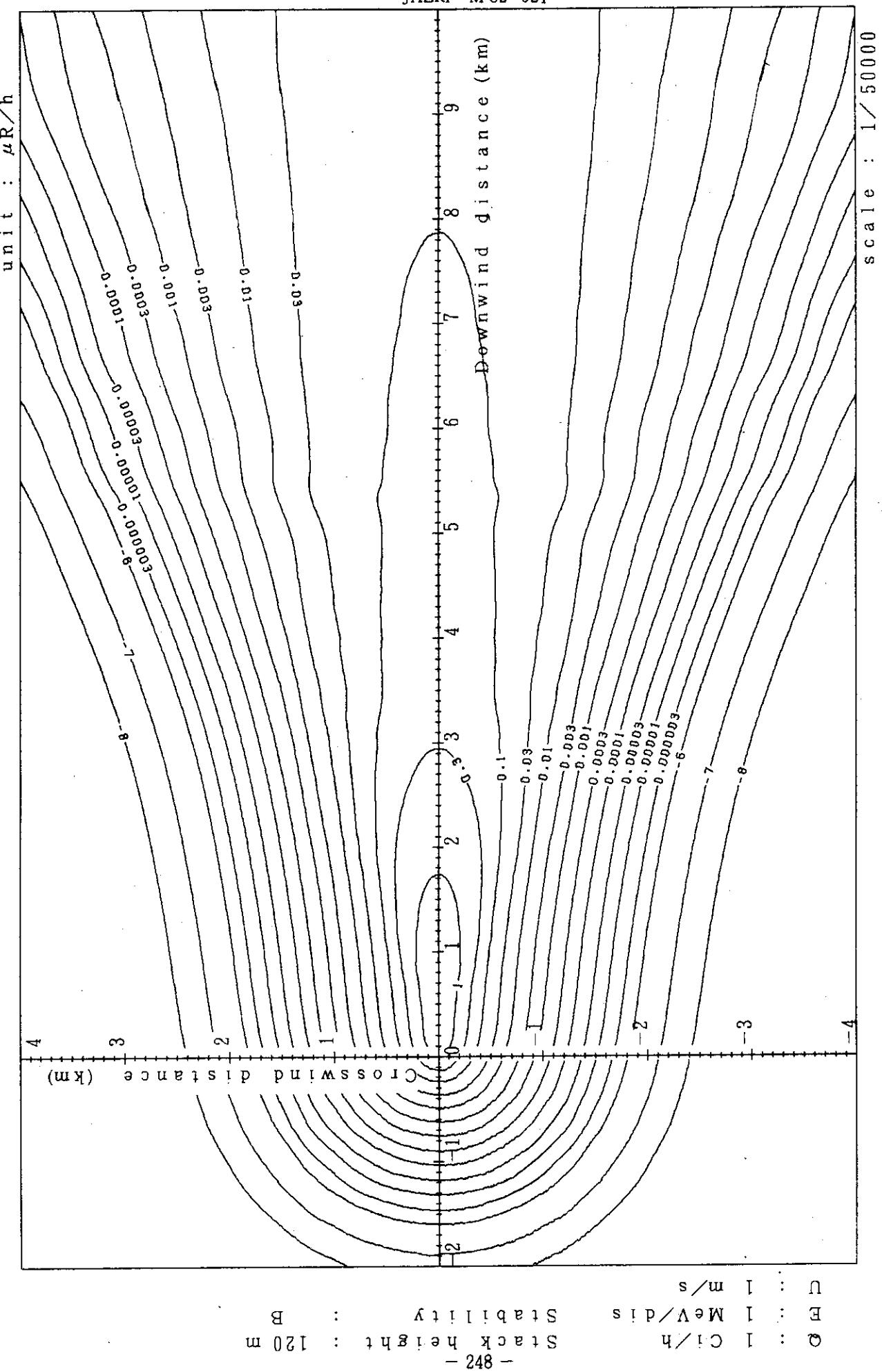


Fig. 4-8-2 (B) Isopleths of surface exposure rate

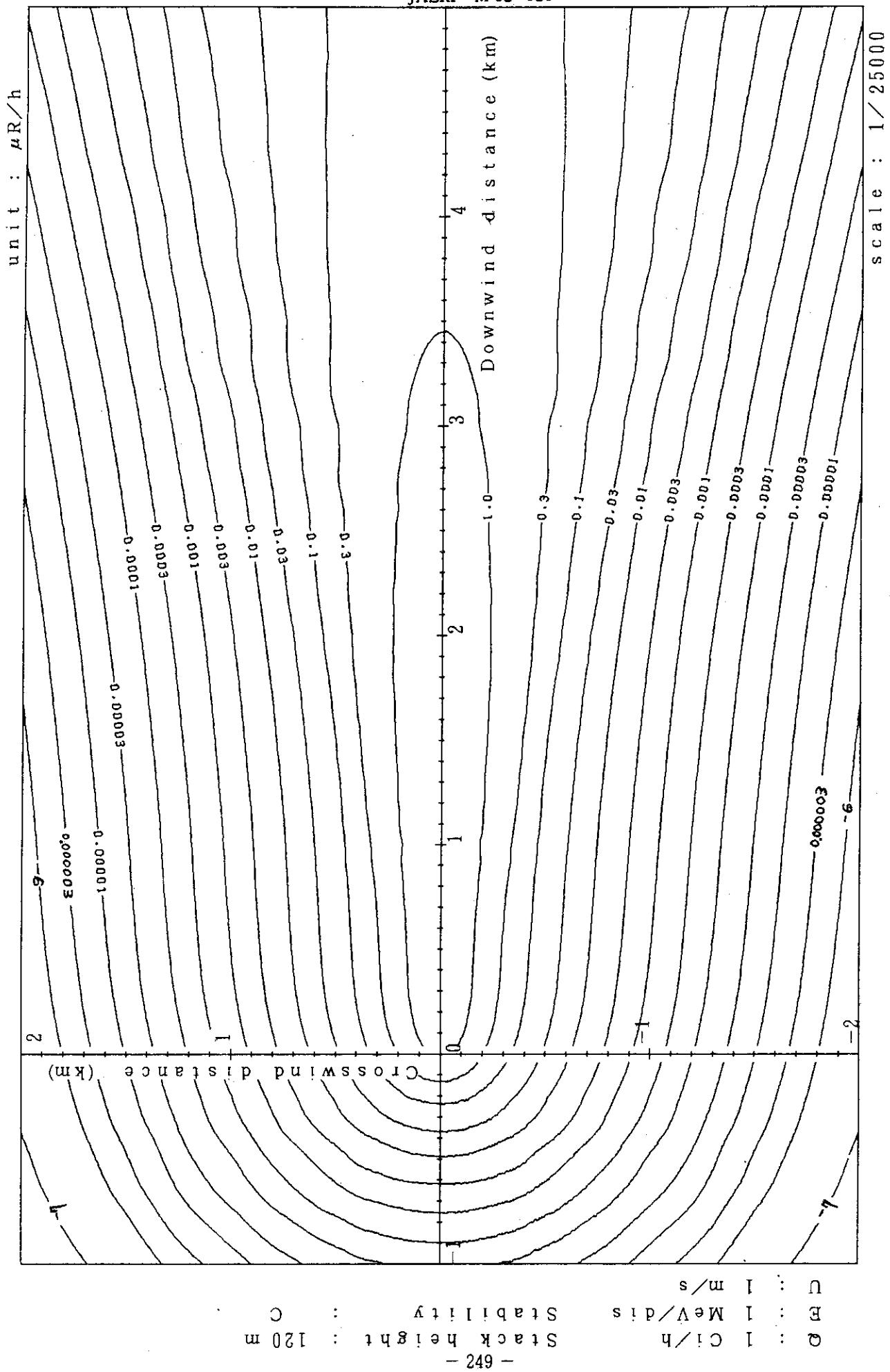
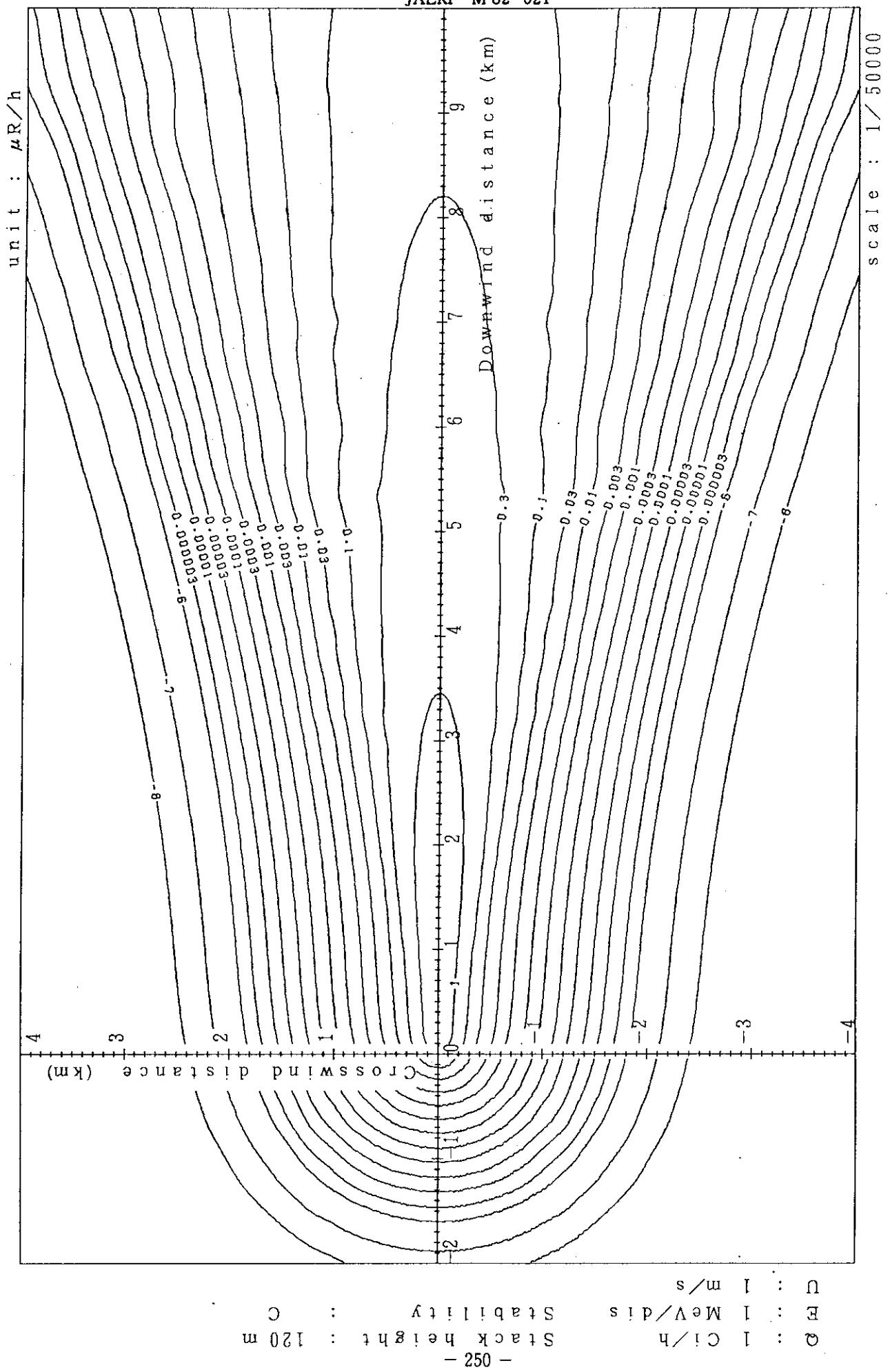


Fig. 4-8-3 (A) Isopleths of surface exposure rate



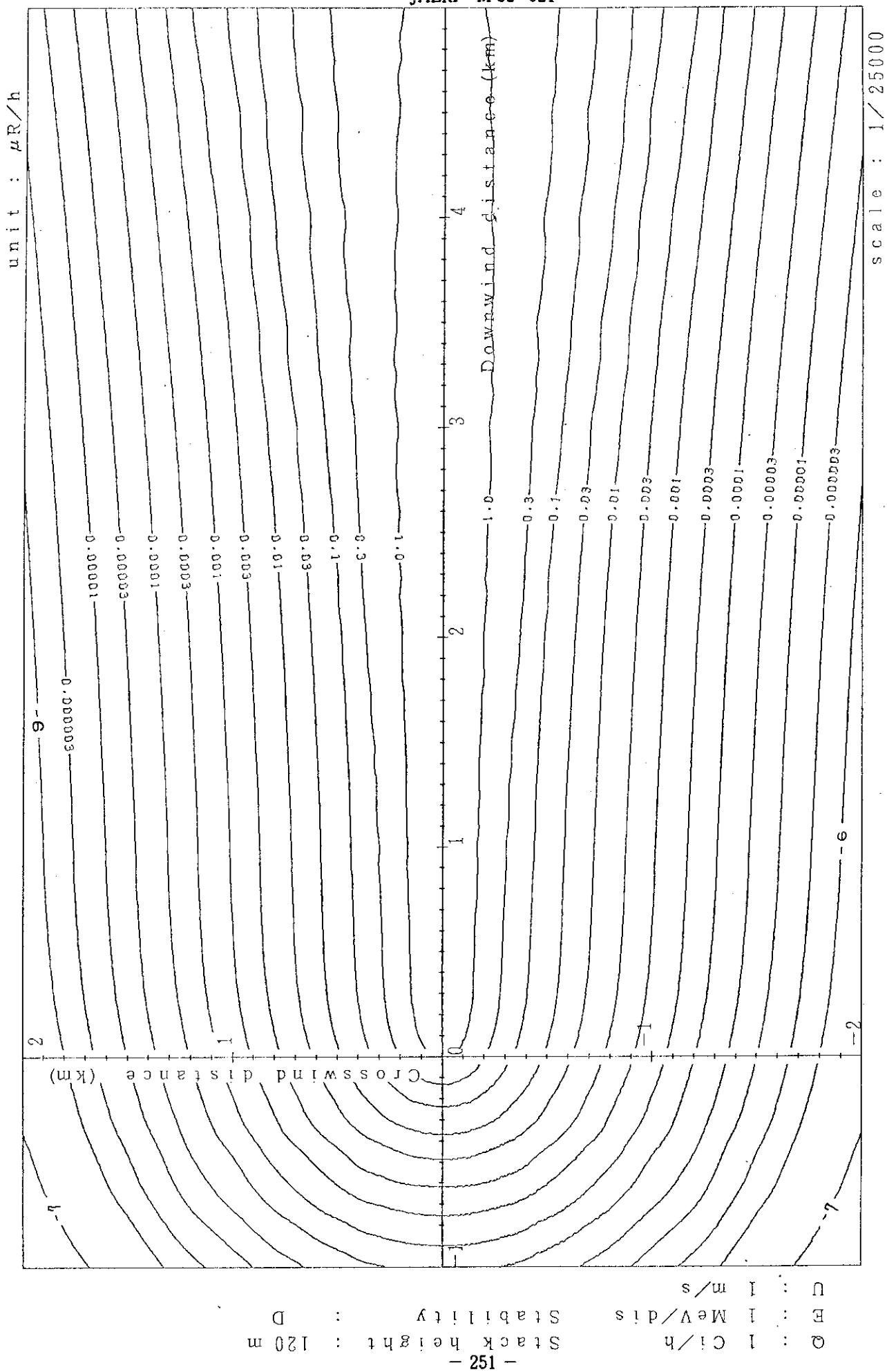


Fig. 4-8-4 (A) Isopleths of surface exposure rate

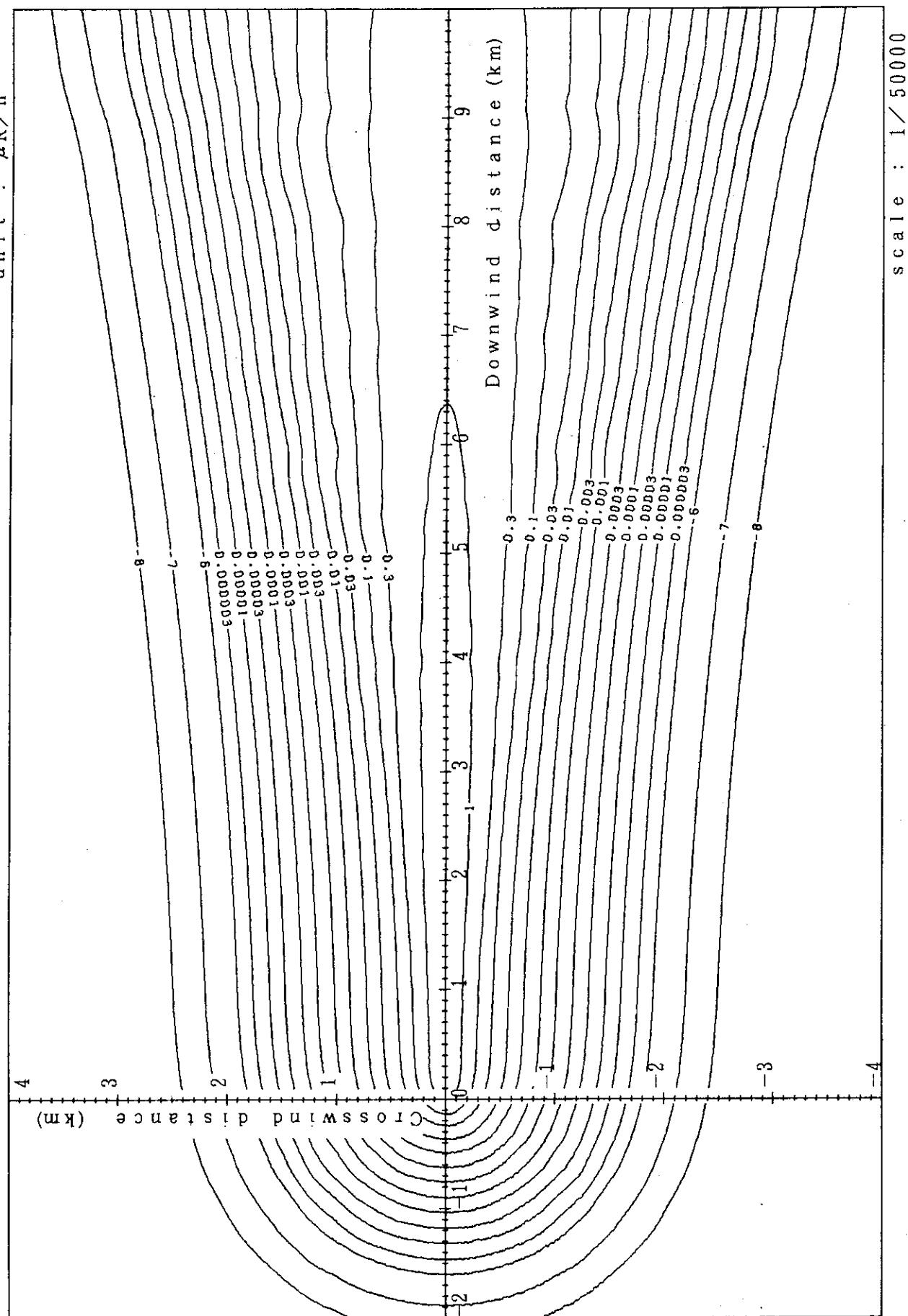


Fig. 4-8-4(B) Isopleths of surface exposure rate

$C_{\text{eff}}$  : 1 Ci/h       $S_{\text{stab/dis}}$  : 1 MeV/di       $H_{\text{stack height}}$  : 120 m  
 $D$  : 1 m/s       $-252 -$

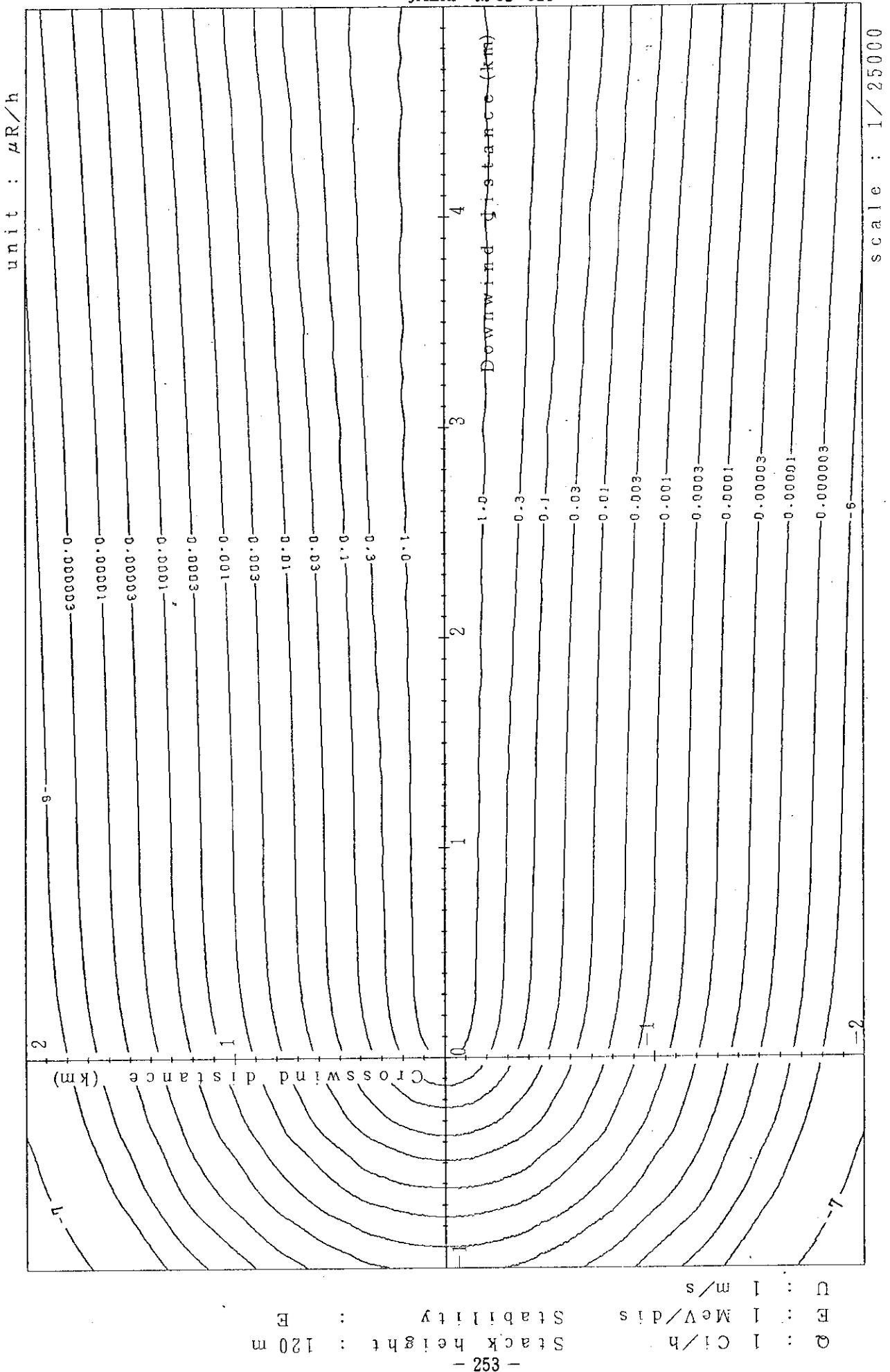


Fig. 4-8-5 (A) Isopleths of surface exposure rate

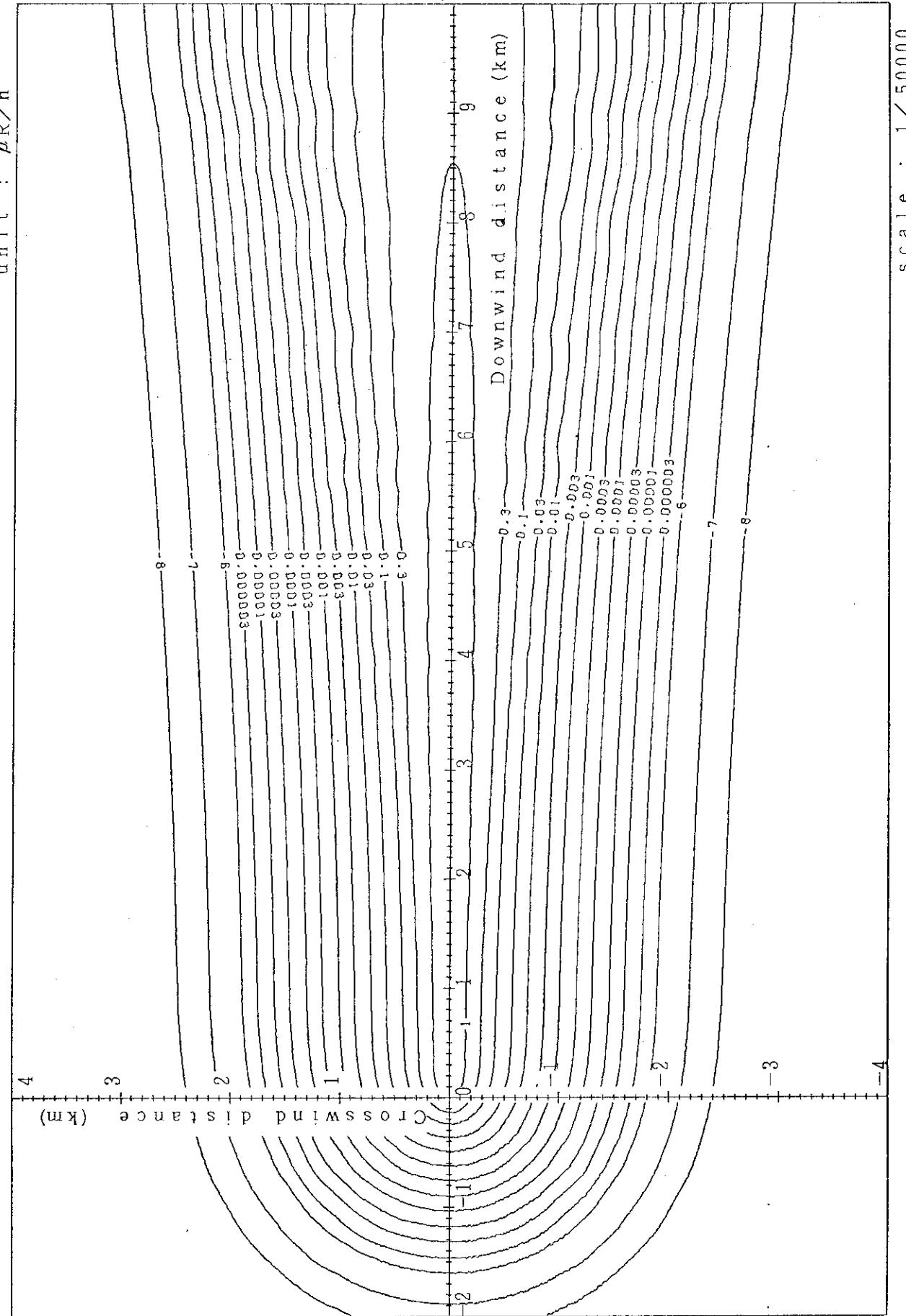


Fig. 4-8-5(B) Isopleths of surface exposure rate

scale : 1/50000

Unit :  $\mu\text{R}/\text{h}$   
 Crosswind distance : 100 m  
 Stack height : 120 m  
 $\text{Ci}/\text{h}$  : 1  
 $\text{MeV/dis}$  : 1  
 Stability : E

JAERI-M 82-021

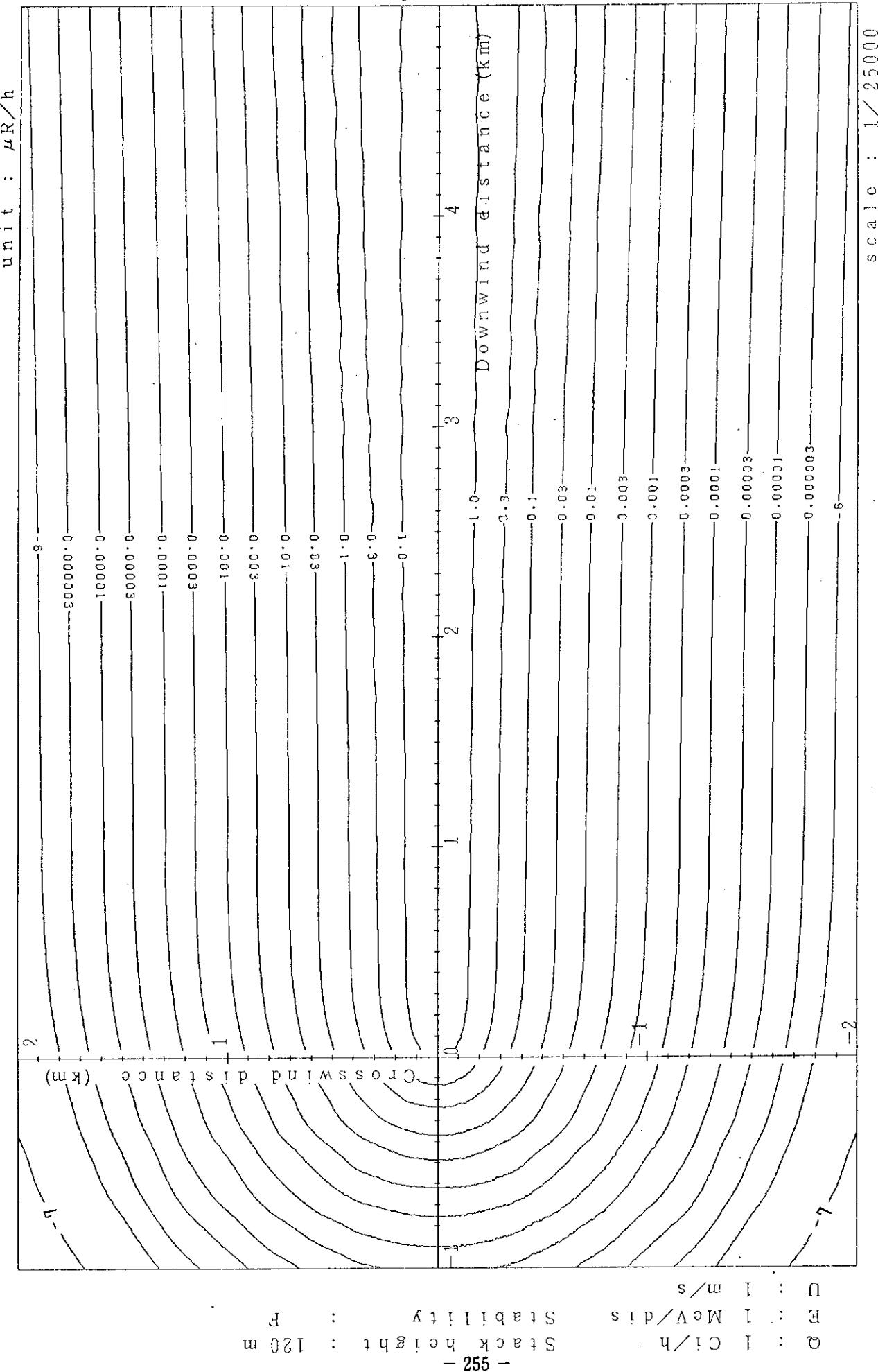


Fig. 4-8-6(A) Isopleths of surface exposure rate

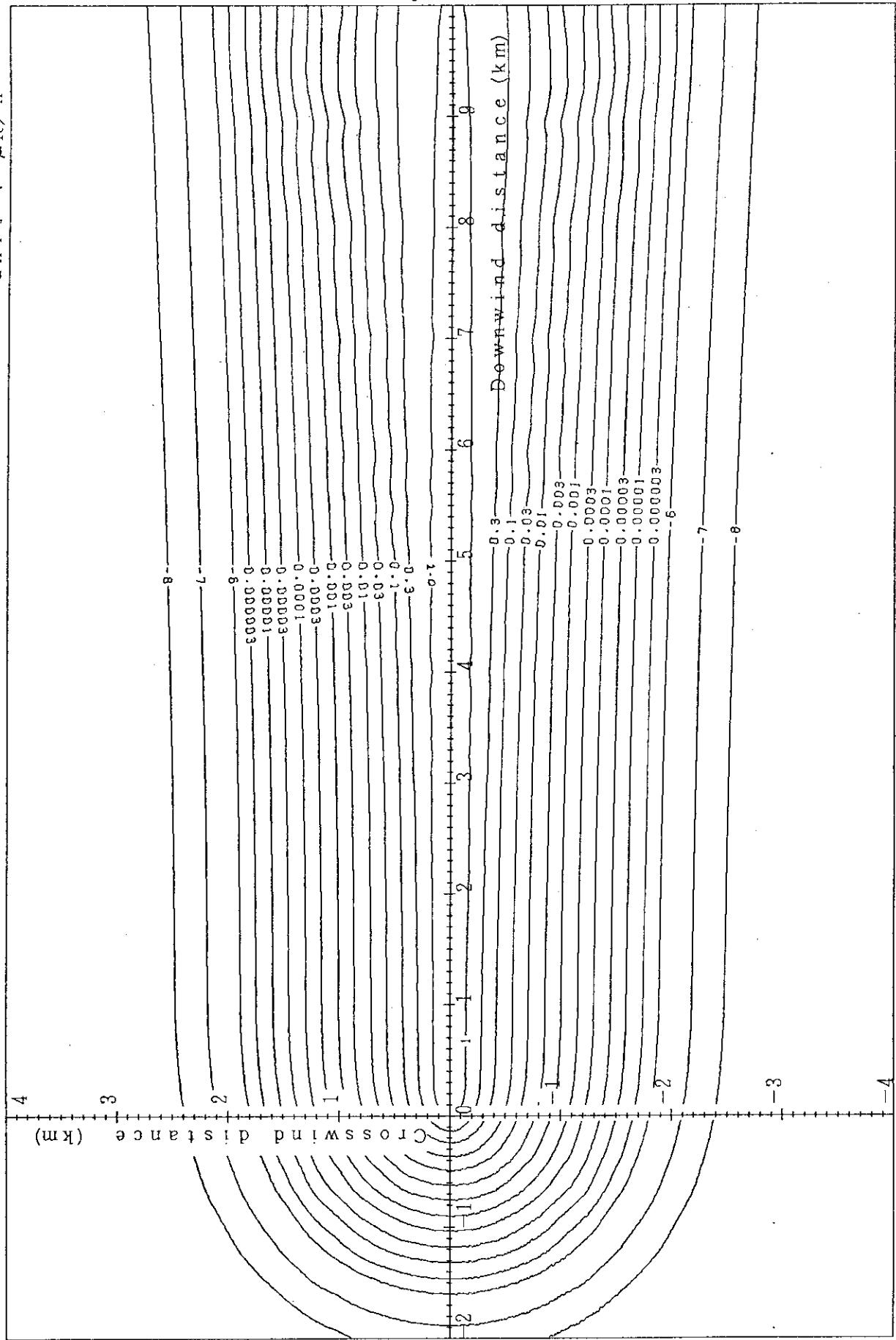
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-8-6(B) Isopleths of surface exposure rate  
 : 1 MeV/di  
 : 120 m  
 : 1 Ci/h  
 : 1 Stabili ty  
 -256-

1 m/s  
 0  
 -1

scale : 1/50000

Fig. 4-8-6(B) Isopleths of surface exposure rate

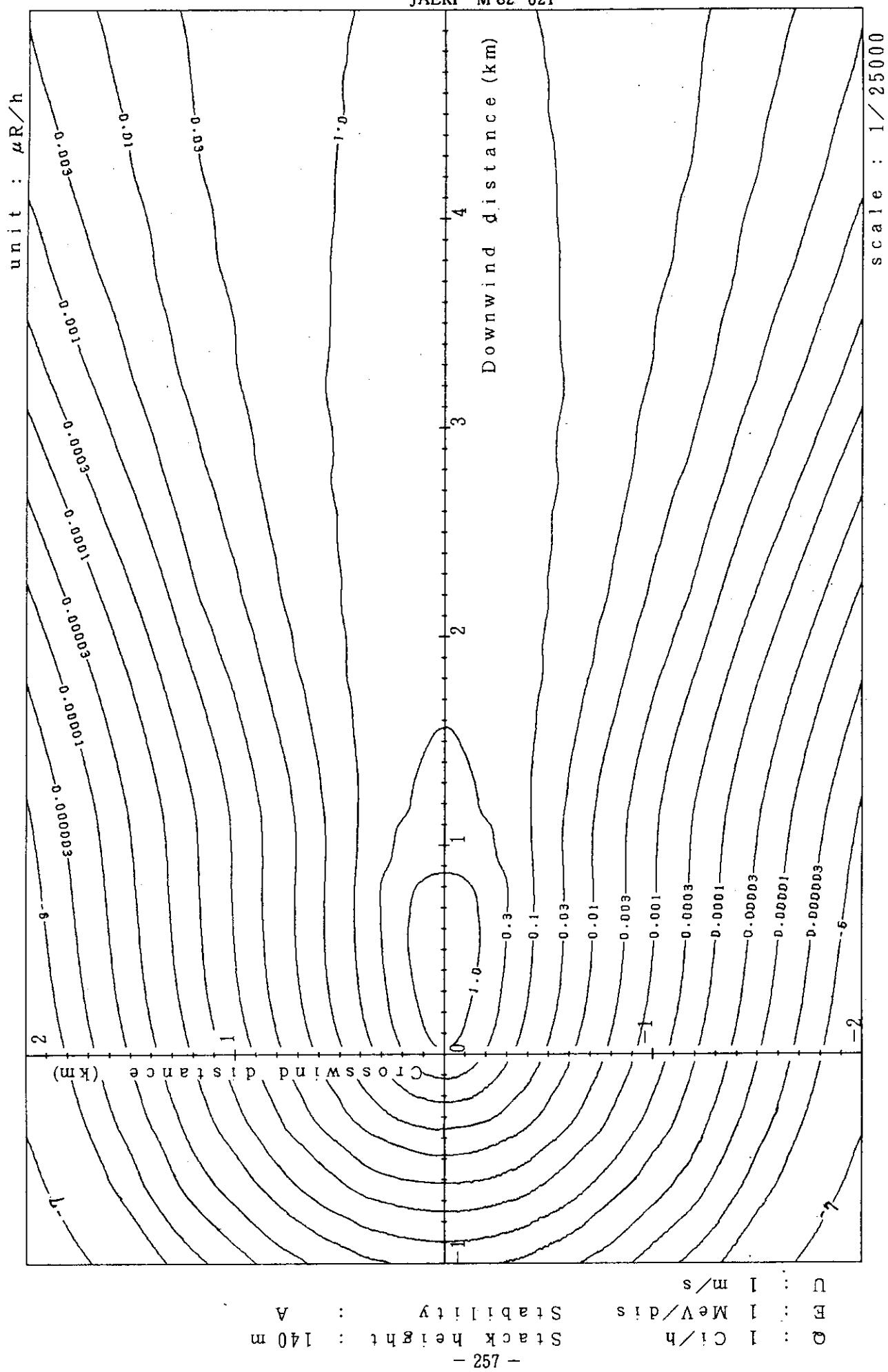


Fig. 4-9-1(A) Isopleths of surface exposure rate

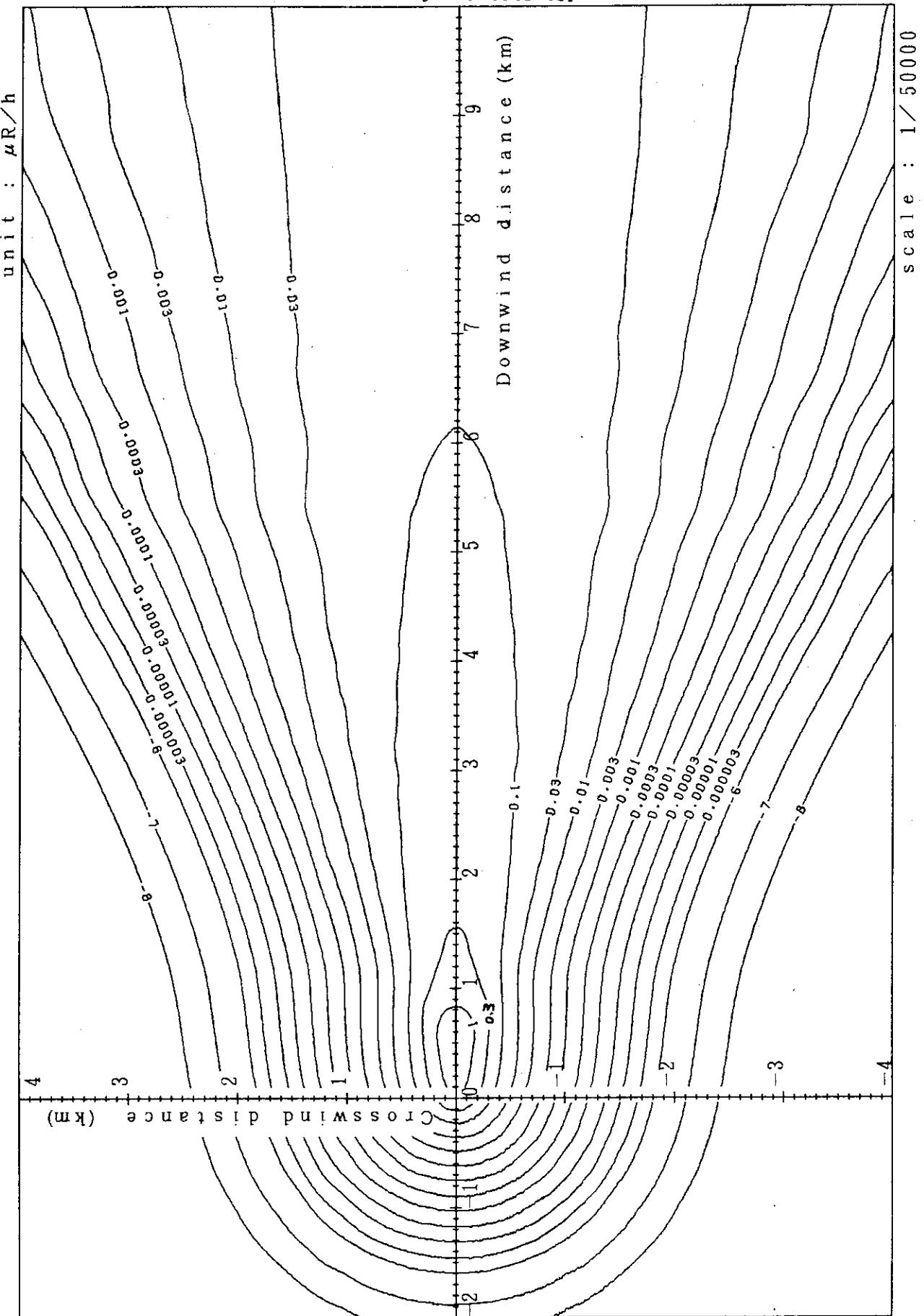


Fig. 4-9-1(B) Isopleths of surface exposure rate

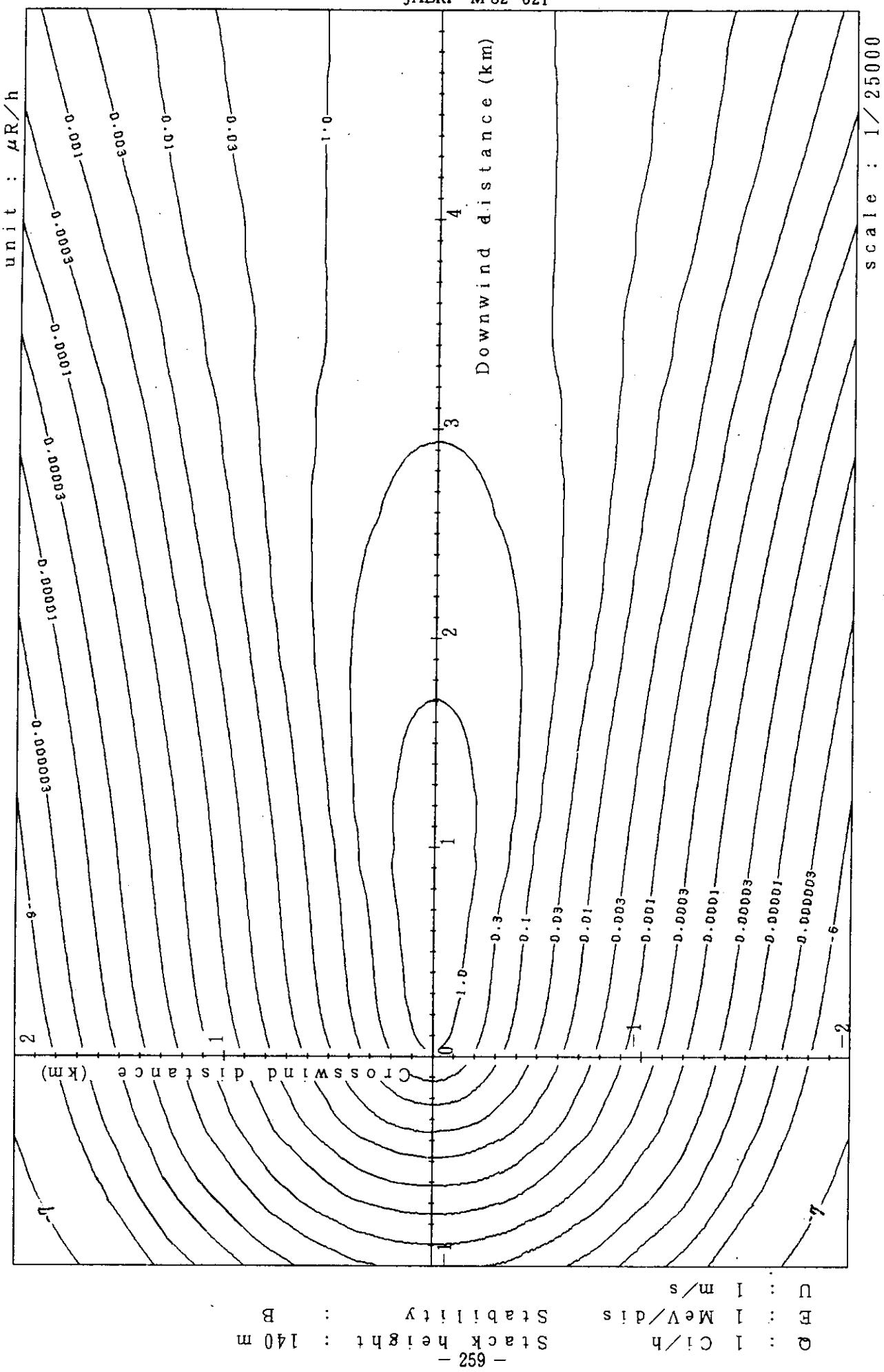
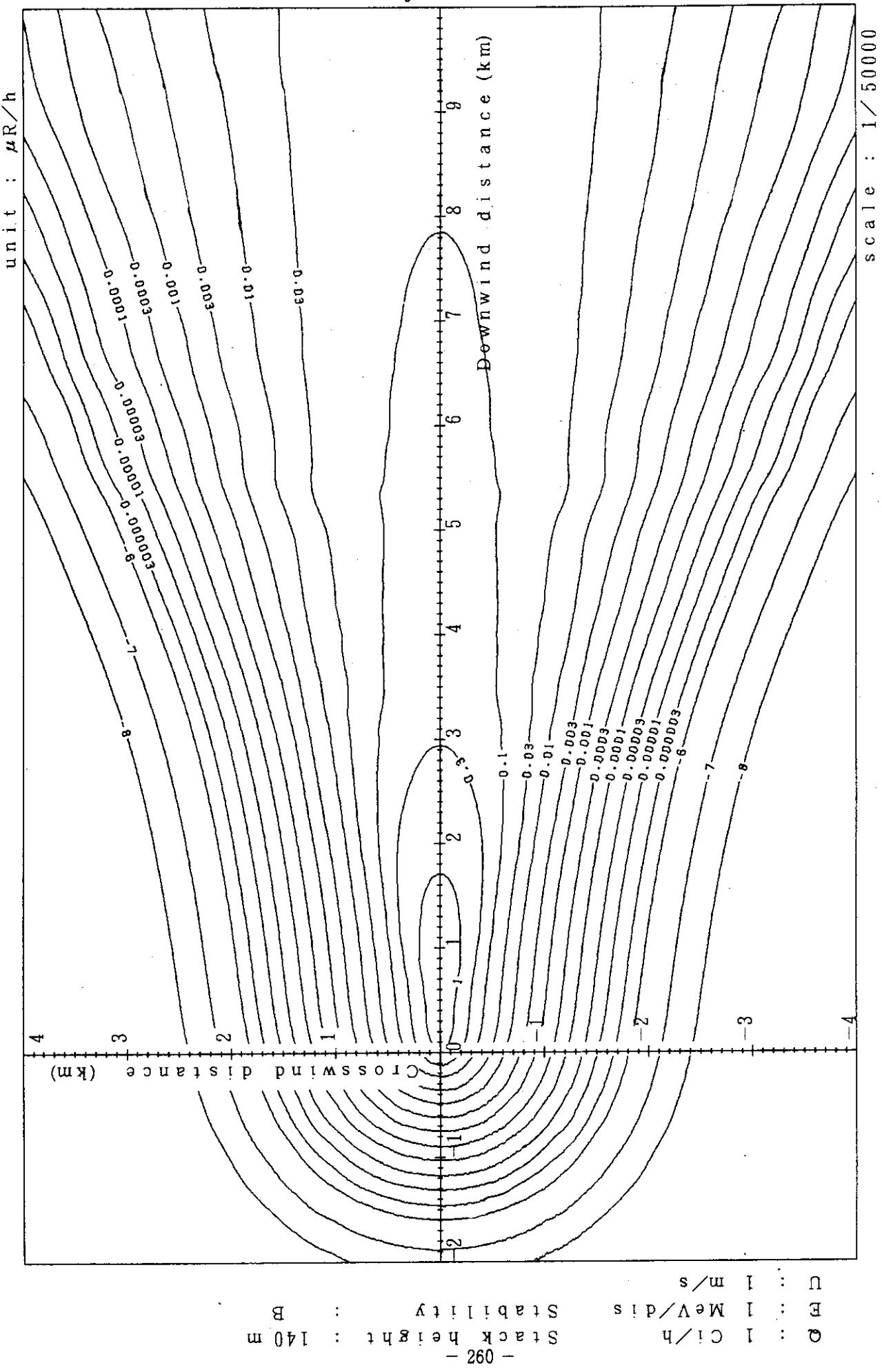


Fig. 4-9-2 (A) Isopleths of surface exposure rate



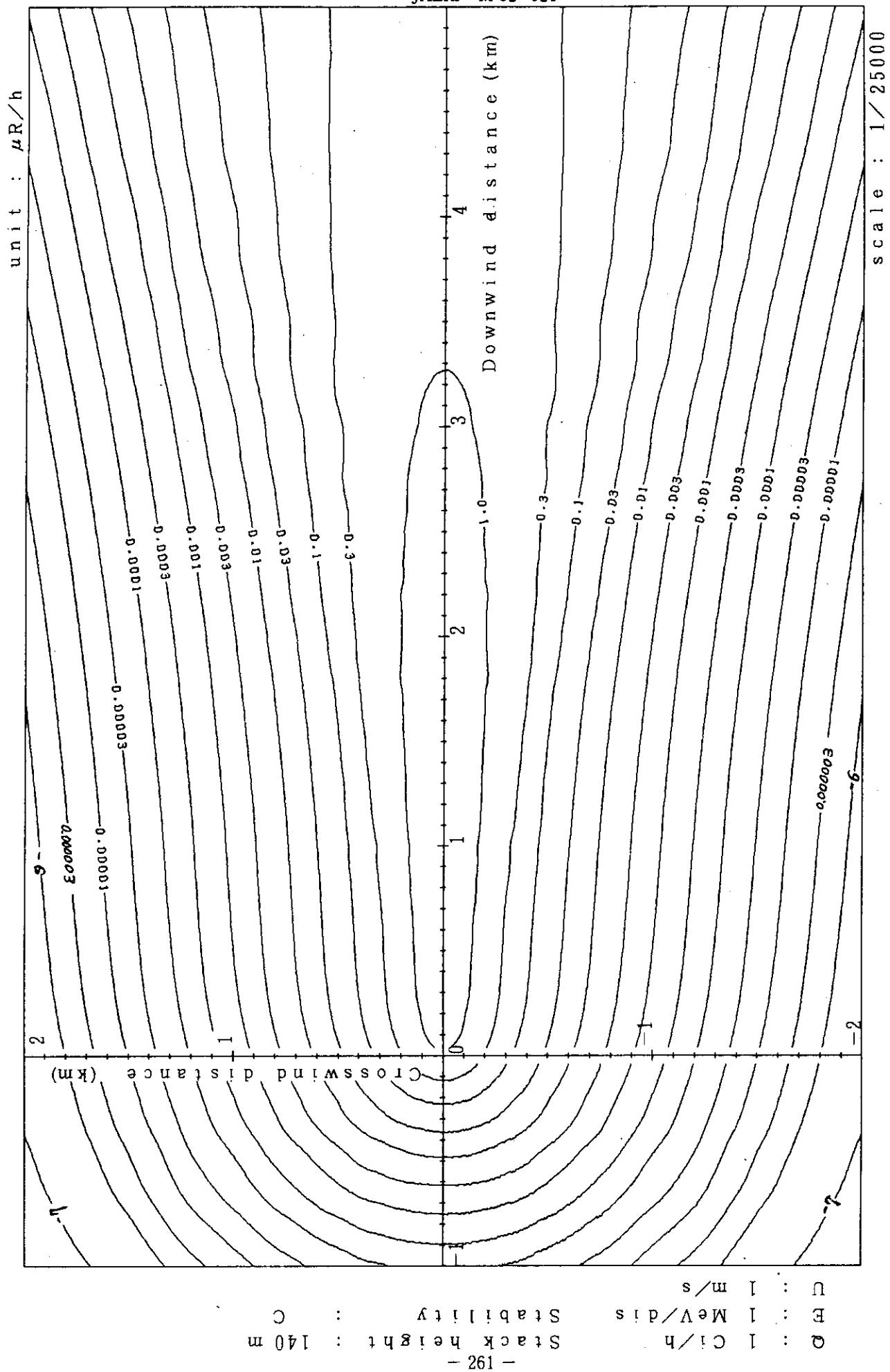
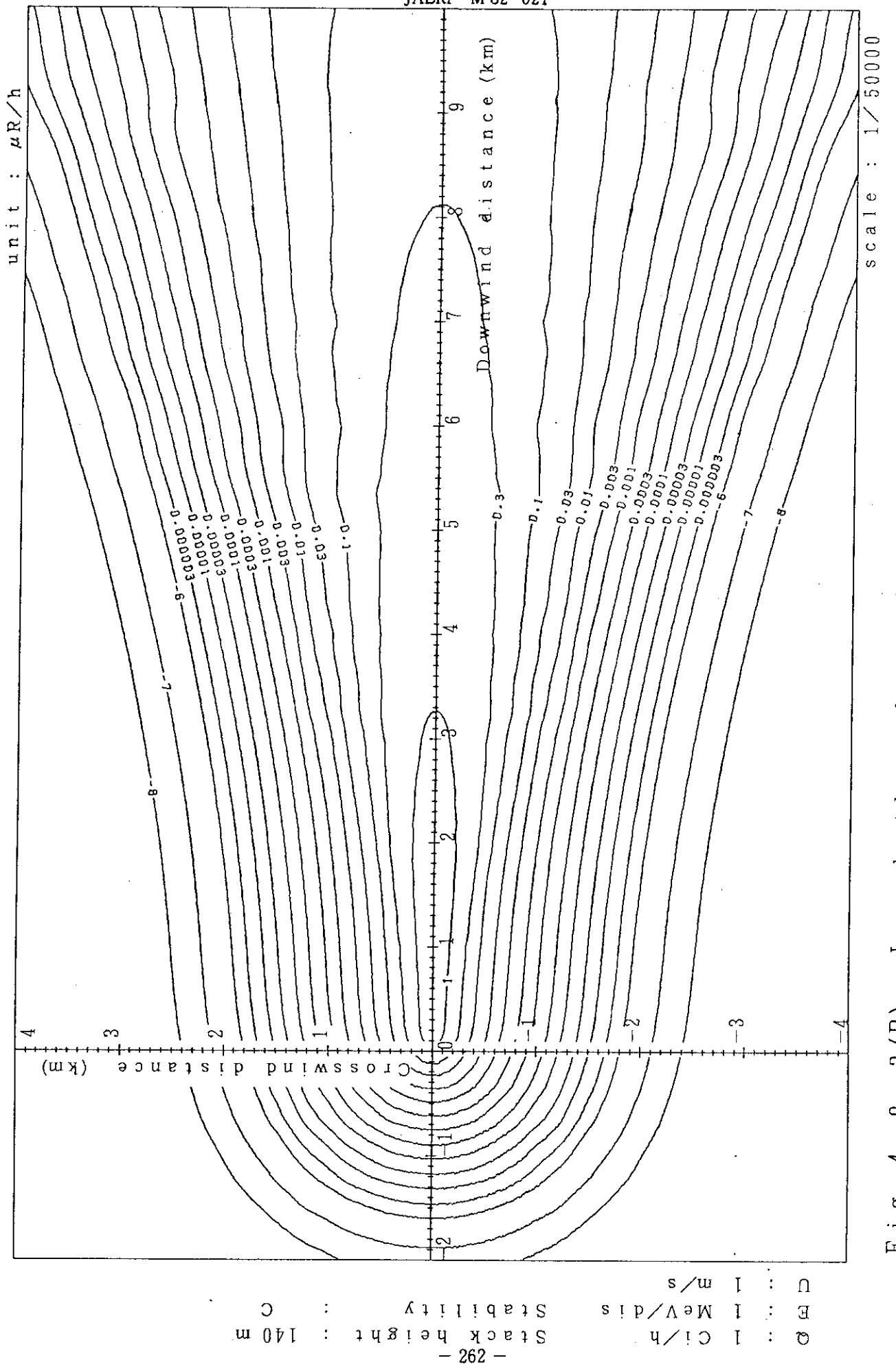


Fig. 4-9-3 (A) Isopleths of surface exposure rate



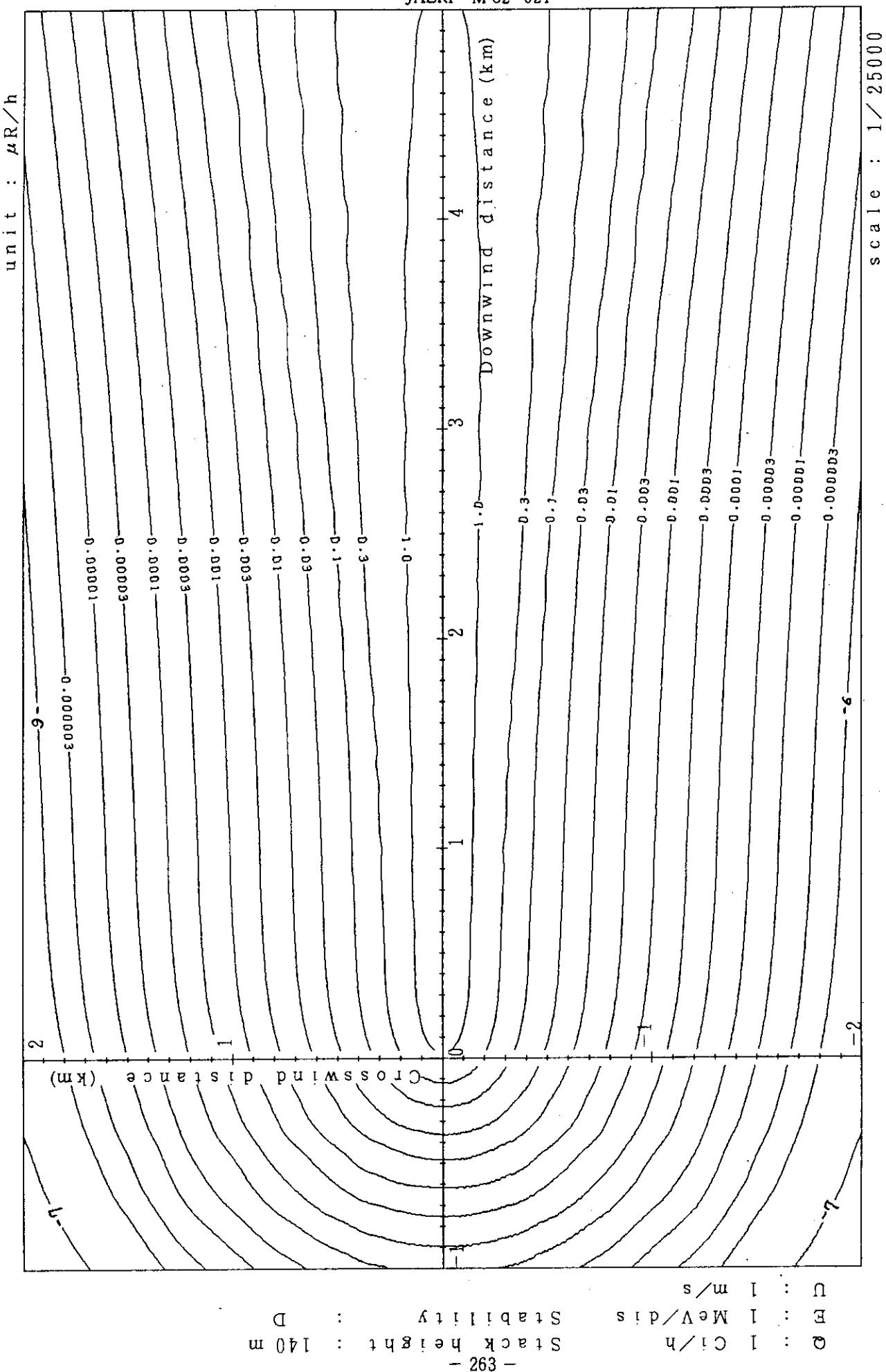
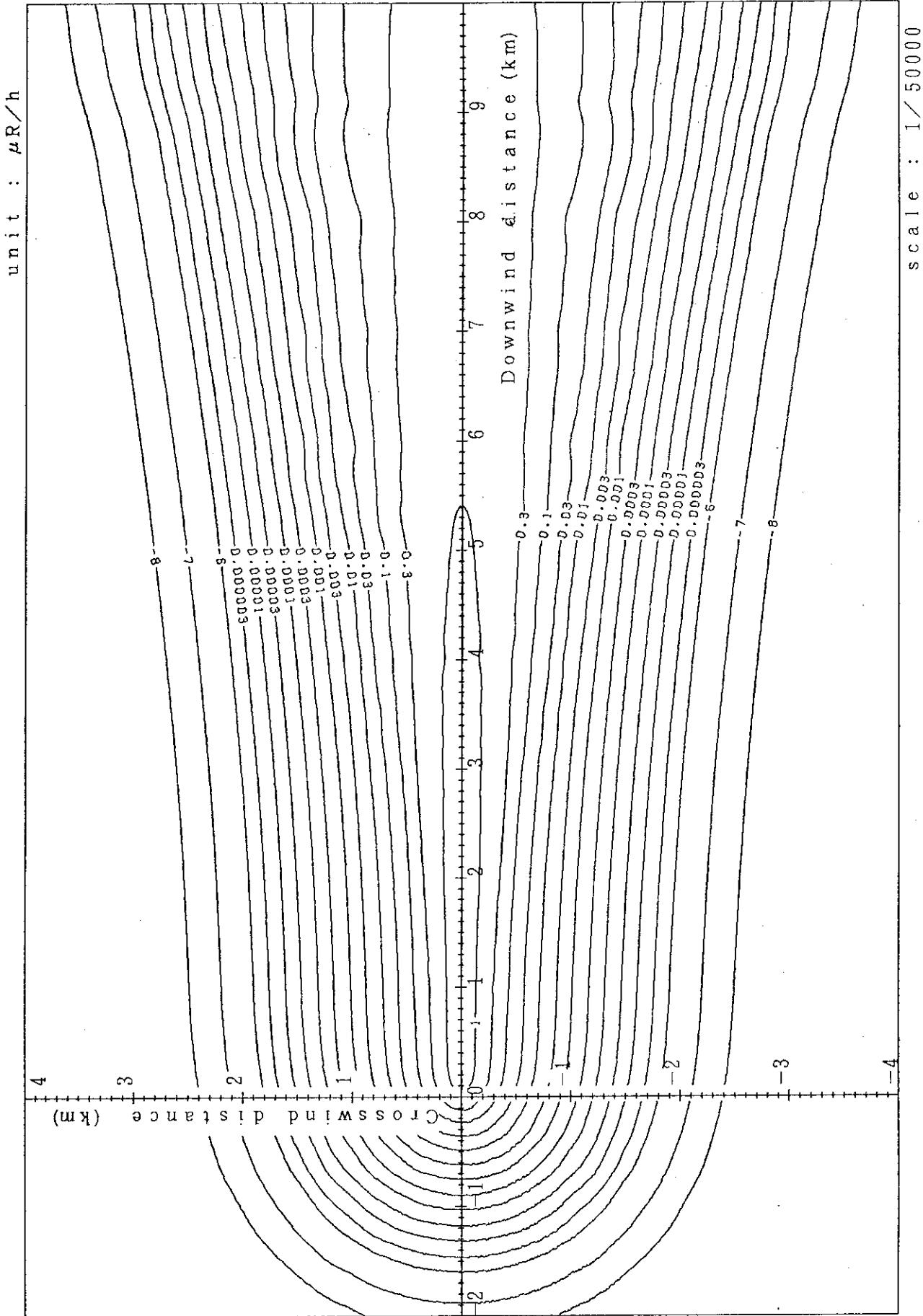


Fig. 4-9-4 (A) Isopleths of surface exposure rate



- 264 -

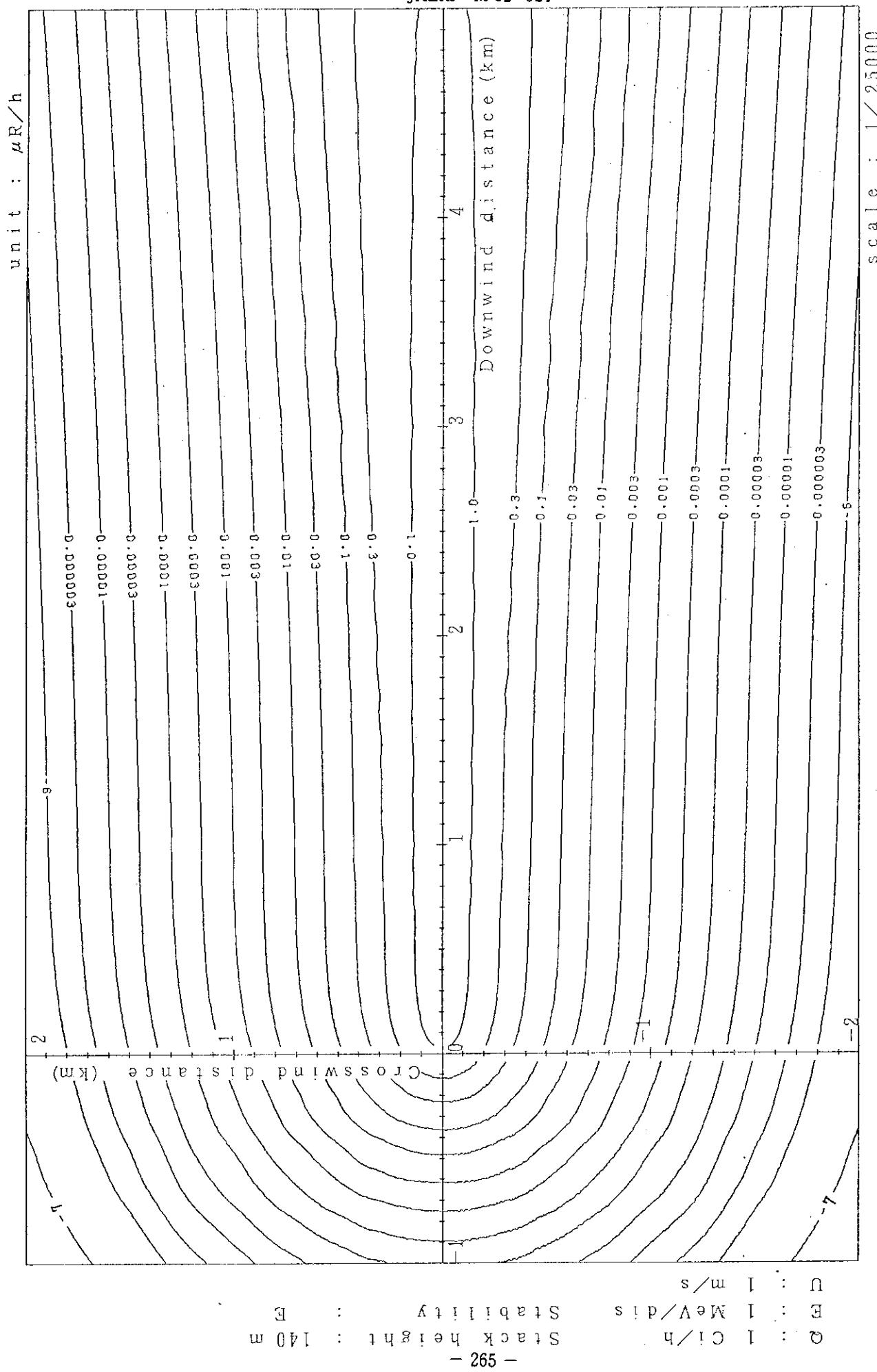


Fig. 4-9-5 (A) Isopleths of surface exposure rate

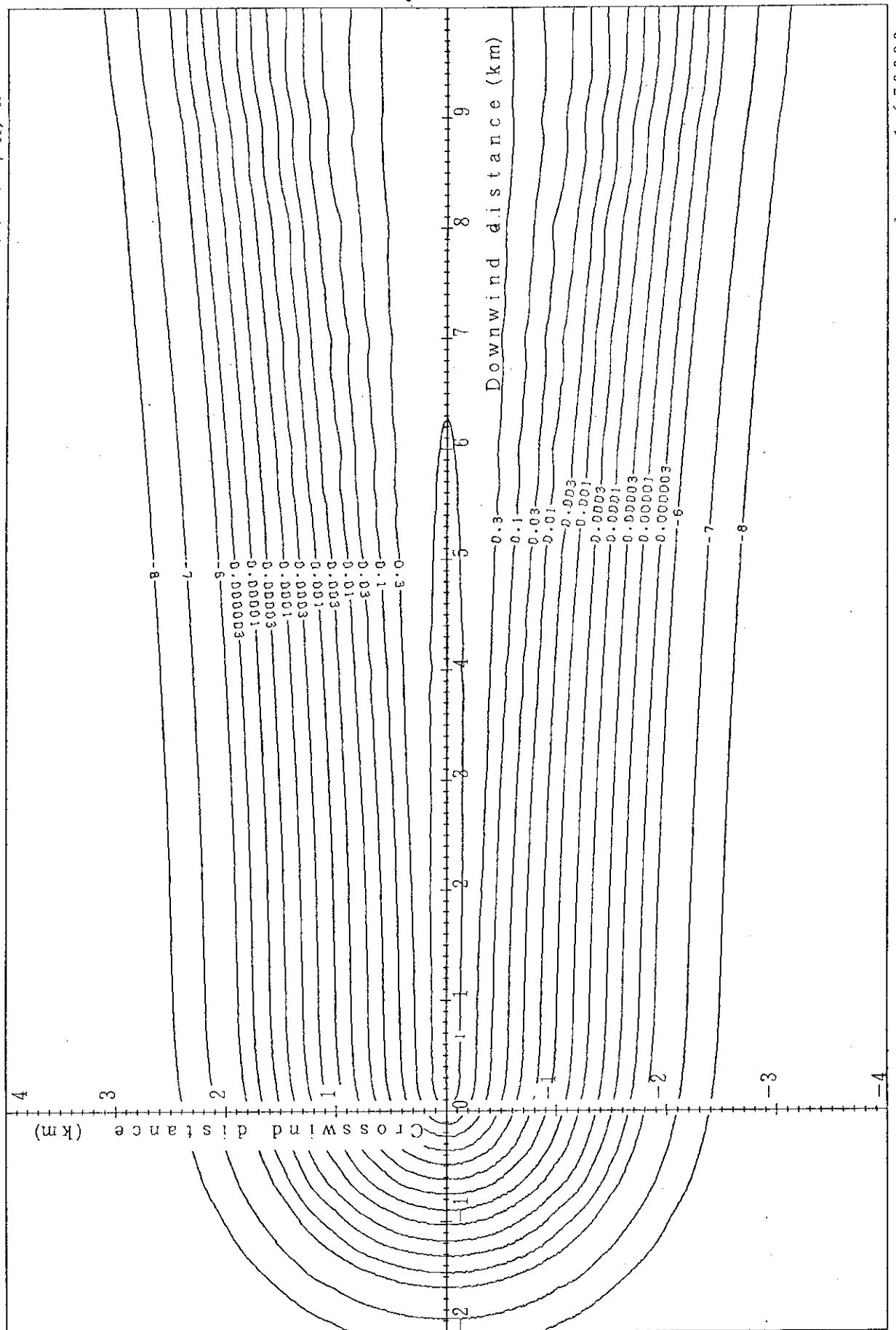
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-9-5 (B) Isopleths of surface exposure rate

JAERI - M 82-021

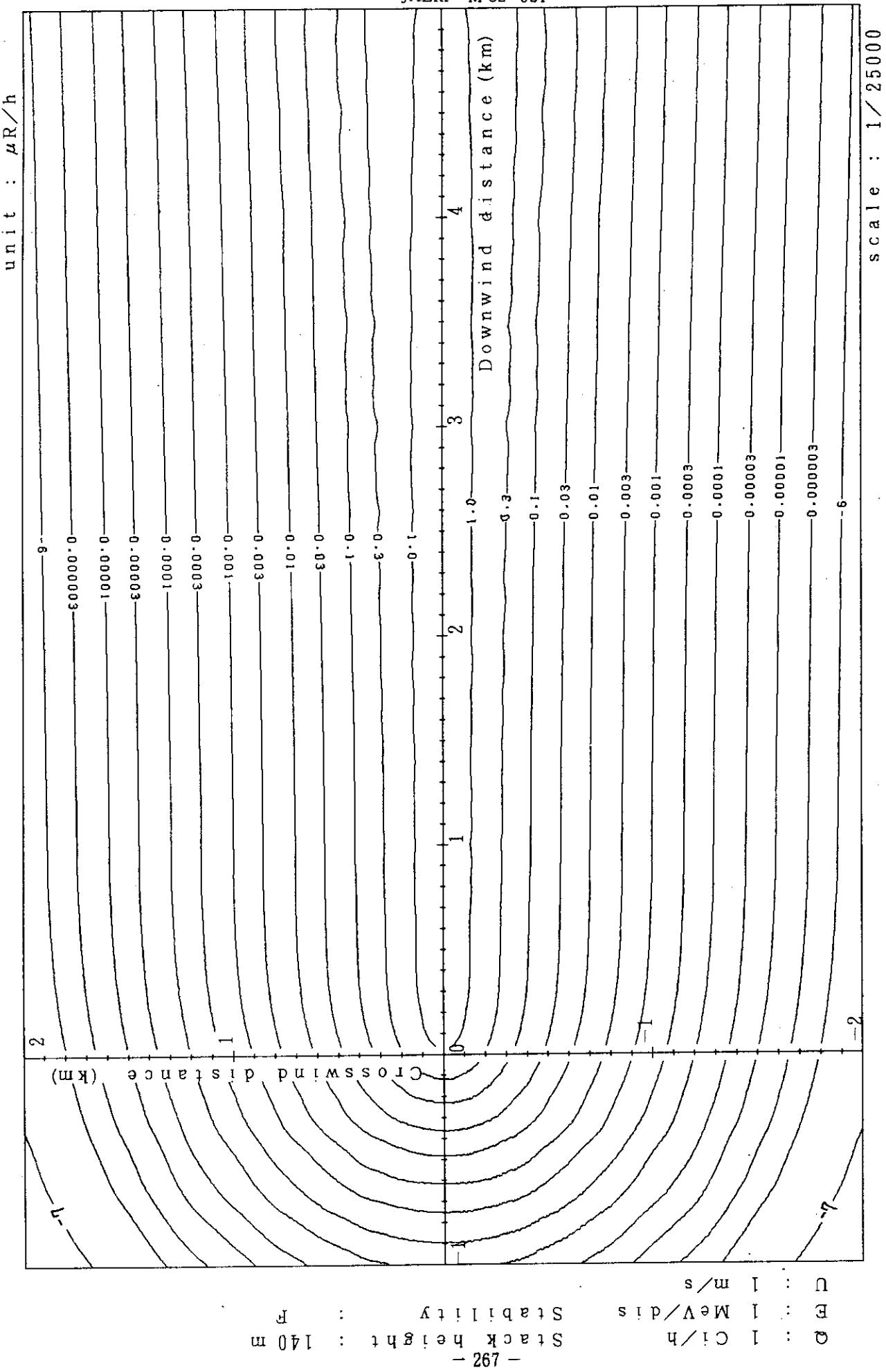


Fig. 4-9-6 (A) Isopleths of surface exposure rate

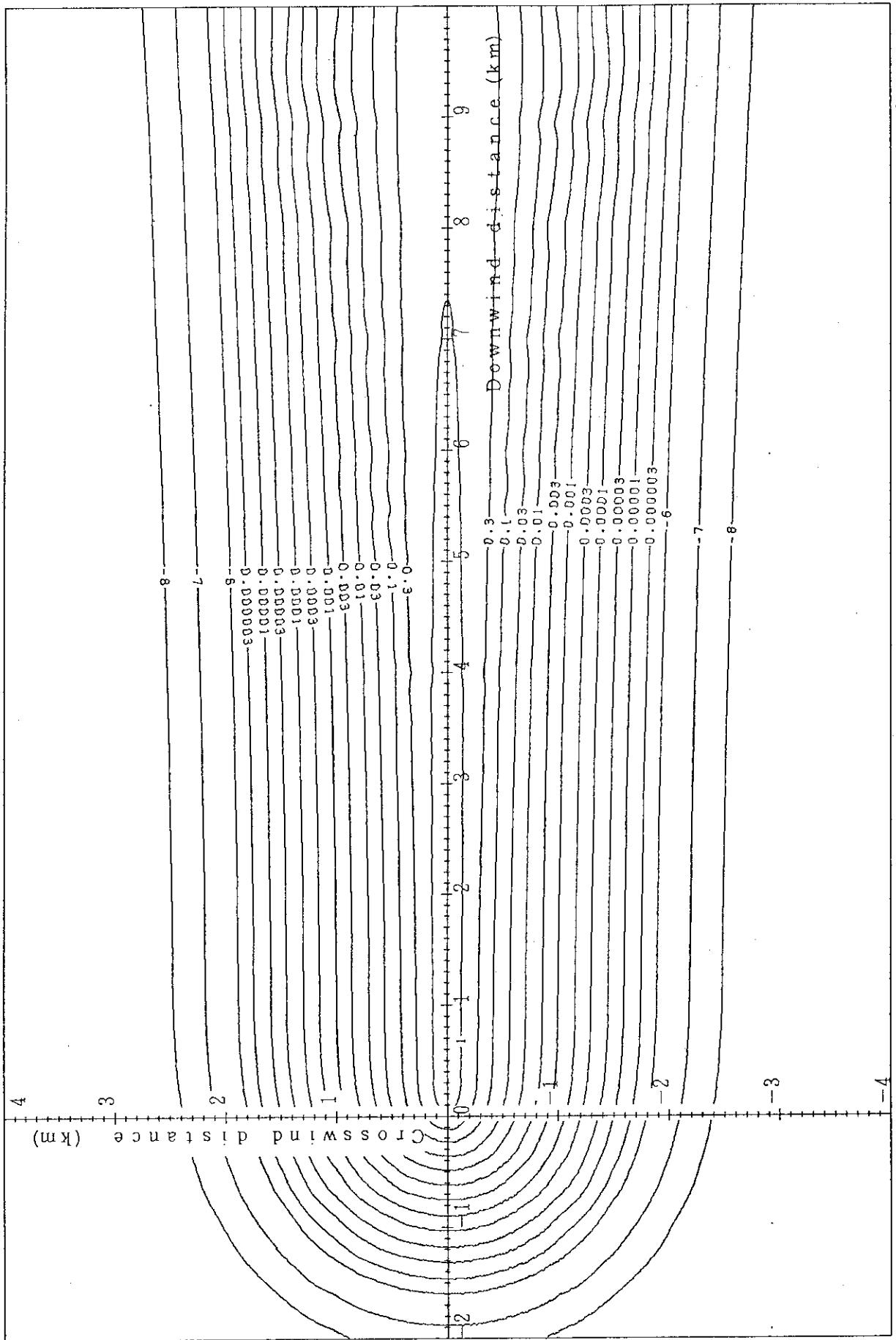
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-9-6 (B) Isopleths of surface exposure rate

scale : 1/50000

Ci/h : 1 MeV/dis : 140 m  
 Stack height : 1 m/s  
 E : 268

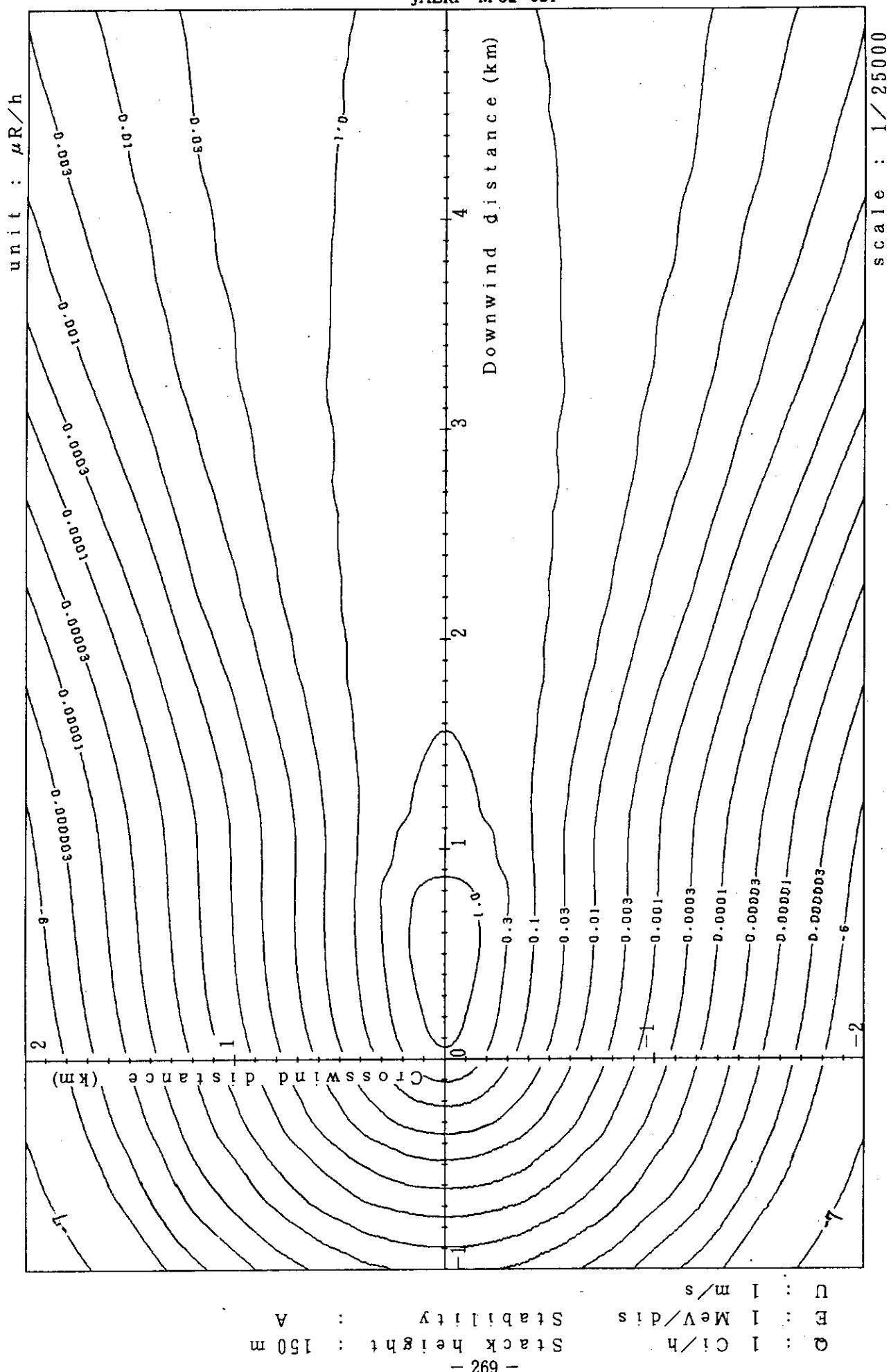


Fig. 4-10-1 (A) Isopleths of surface exposure rate

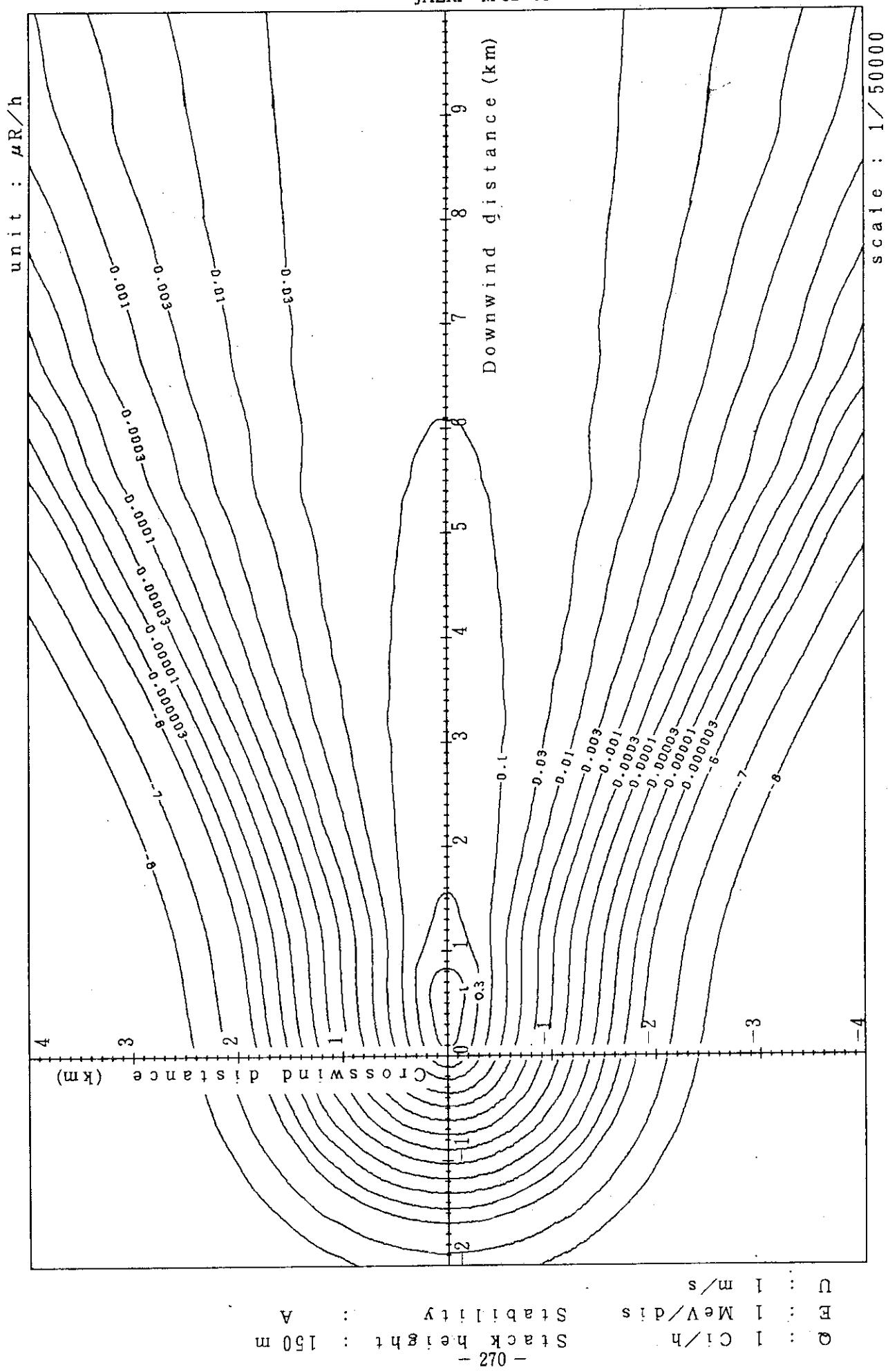


Fig. 4-10-1(B) Isopleths of surface exposure rate

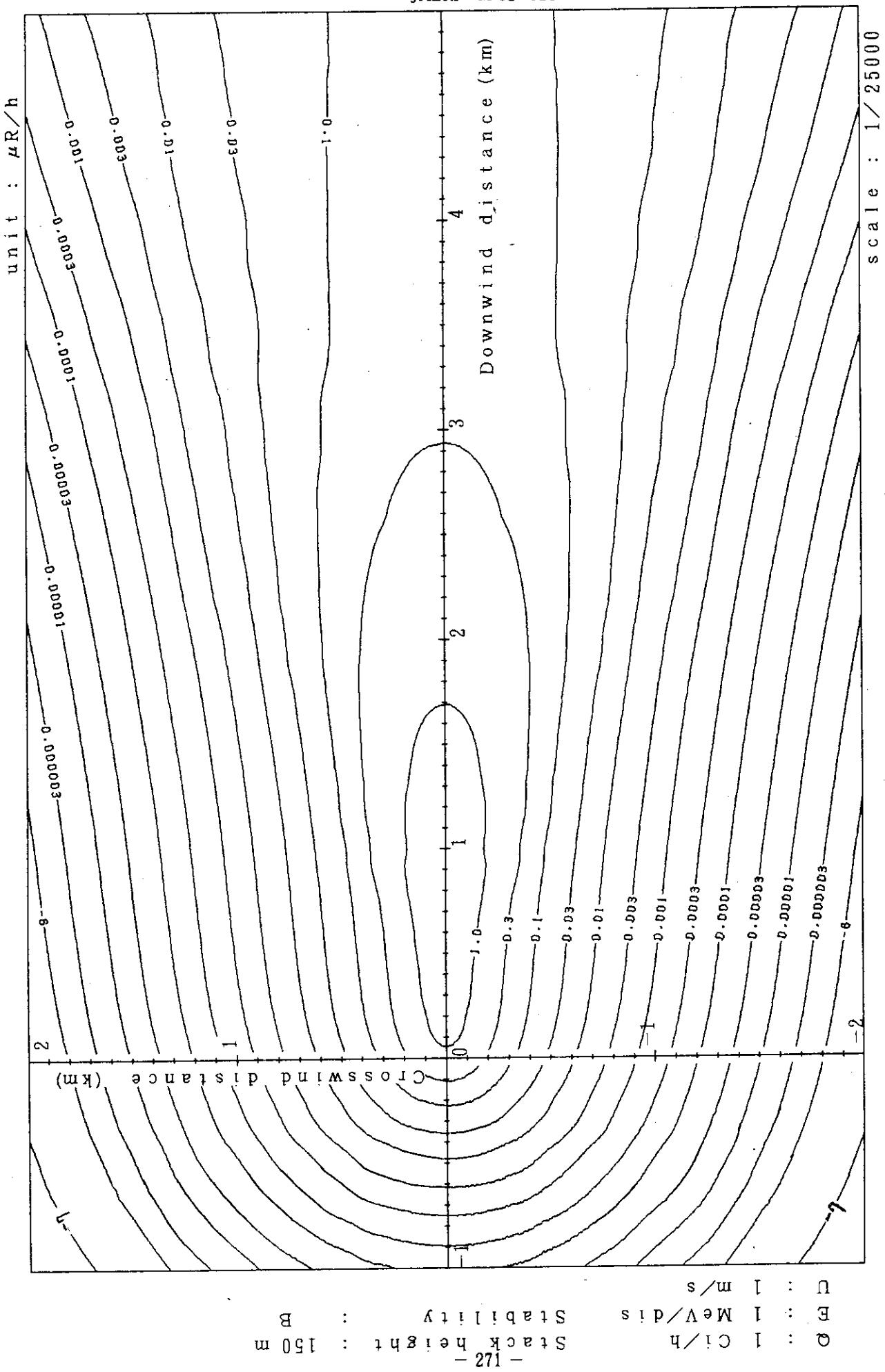


Fig. 4-1.0-2 (A) Isopleths of surface exposure rate

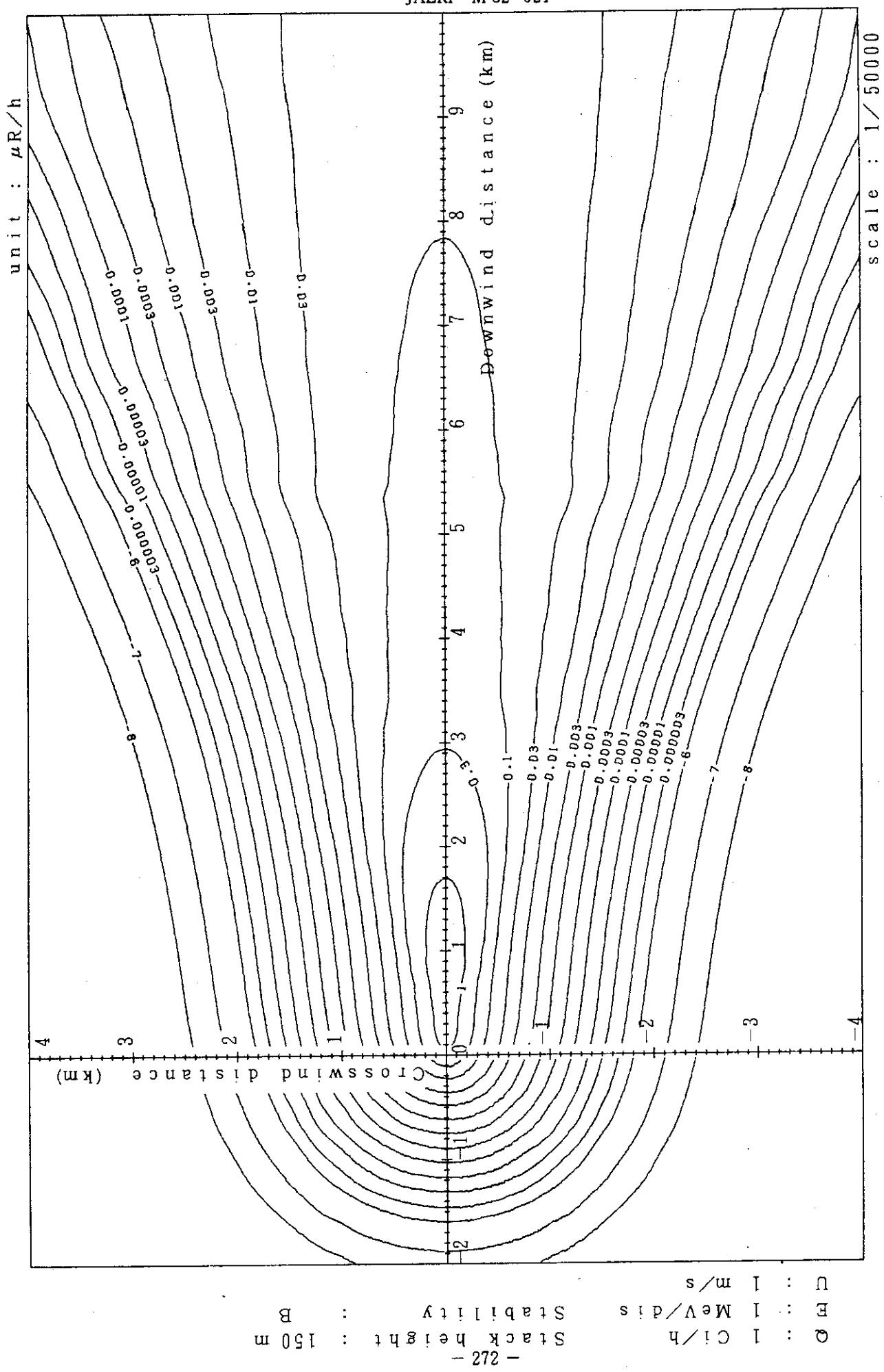
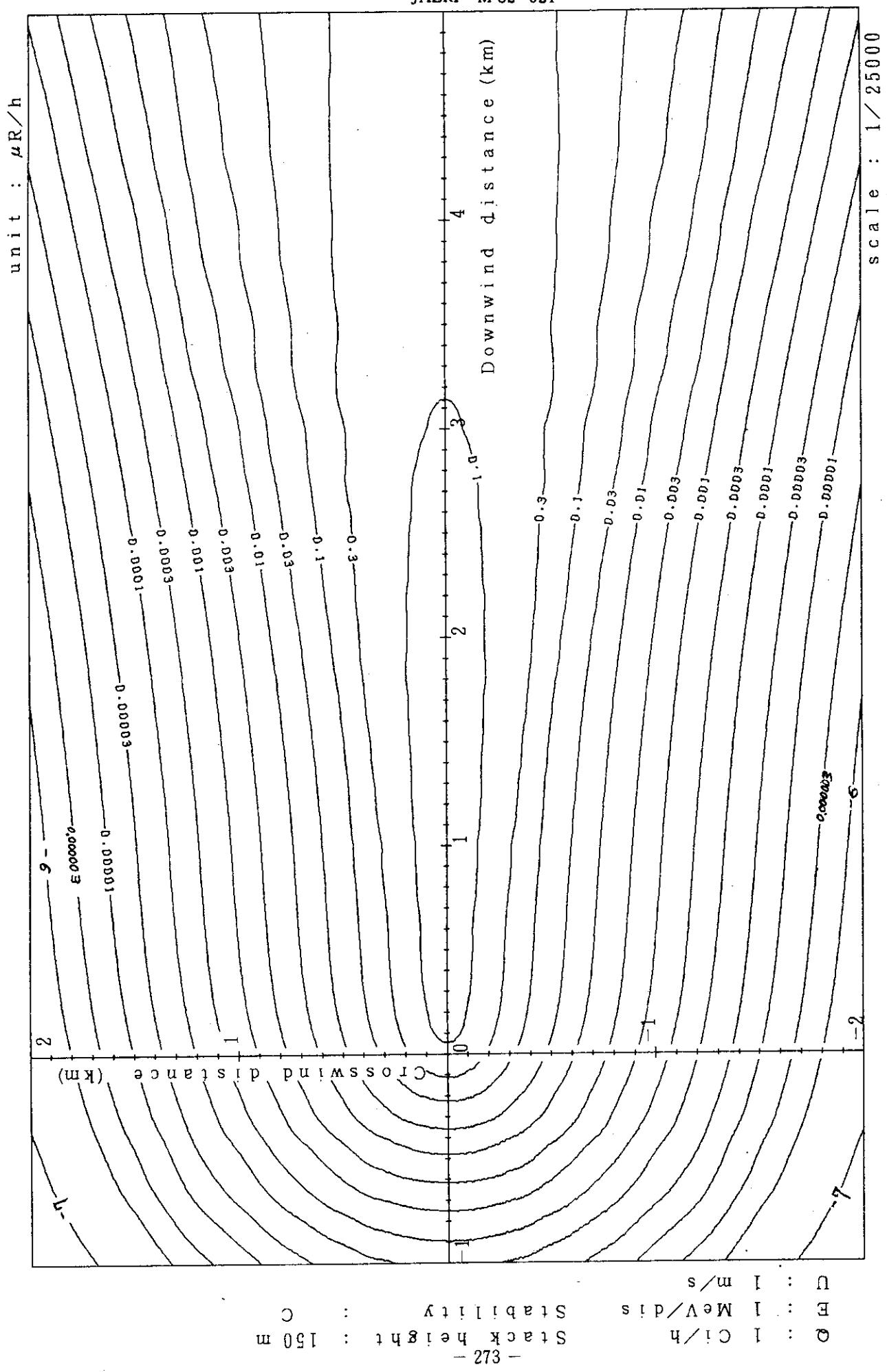


Fig. 4-10-2 (B) Isopleths of surface exposure rate



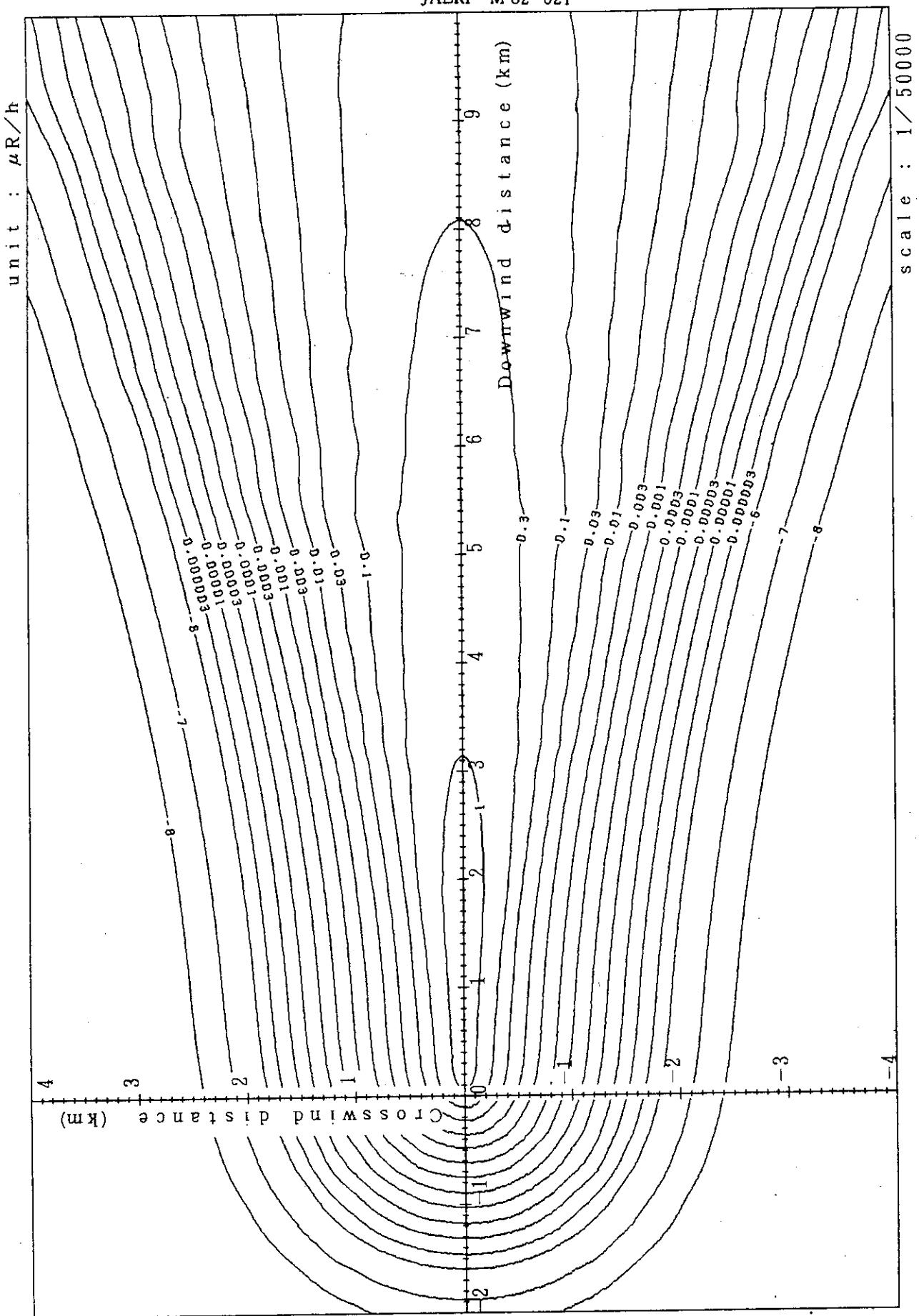


Fig. 4-10-3 (B) Isopleths of surface exposure rate

scale : 1/50000

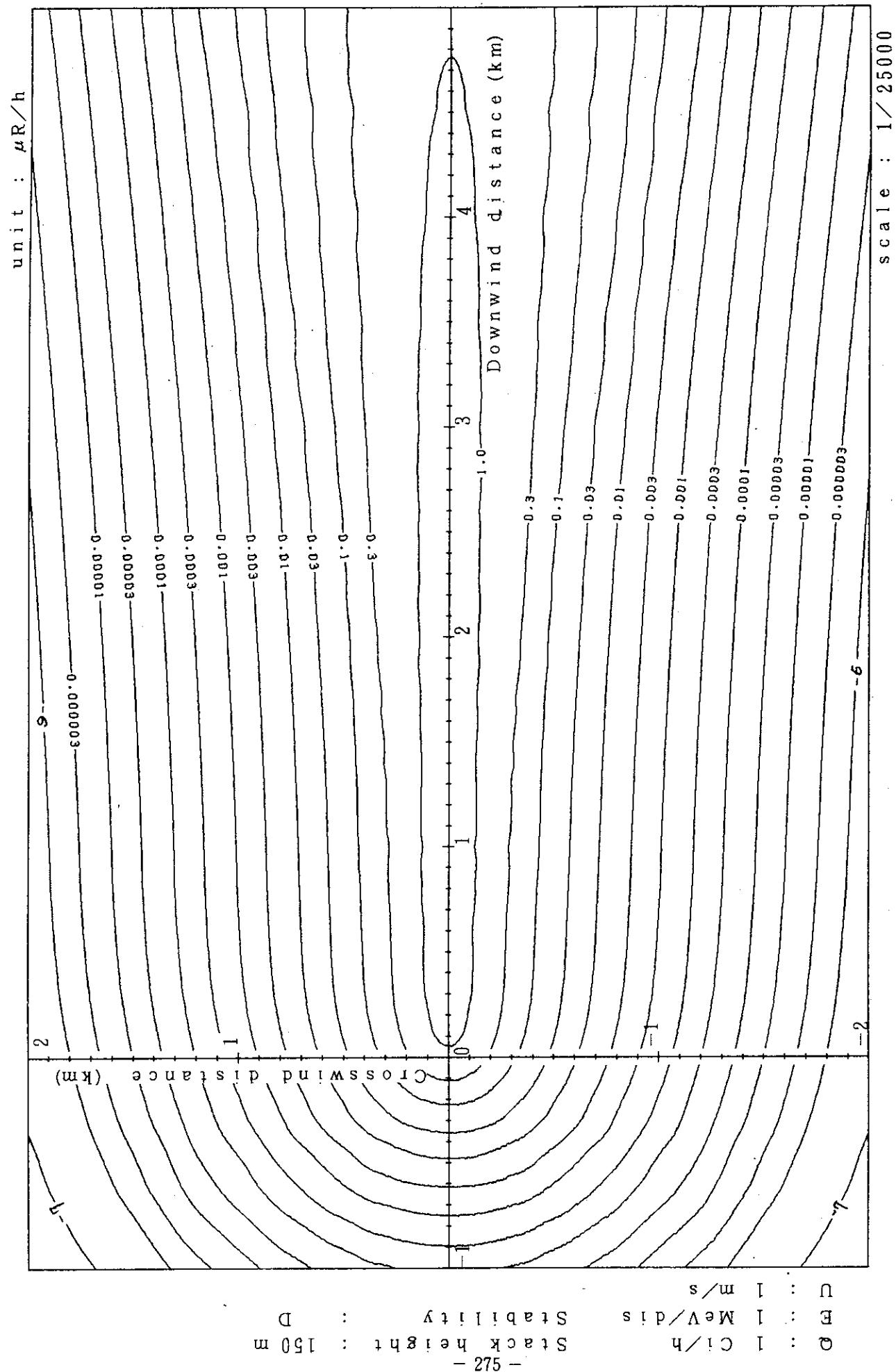


Fig. 4-10-4 (A) Isopleths of surface exposure rate

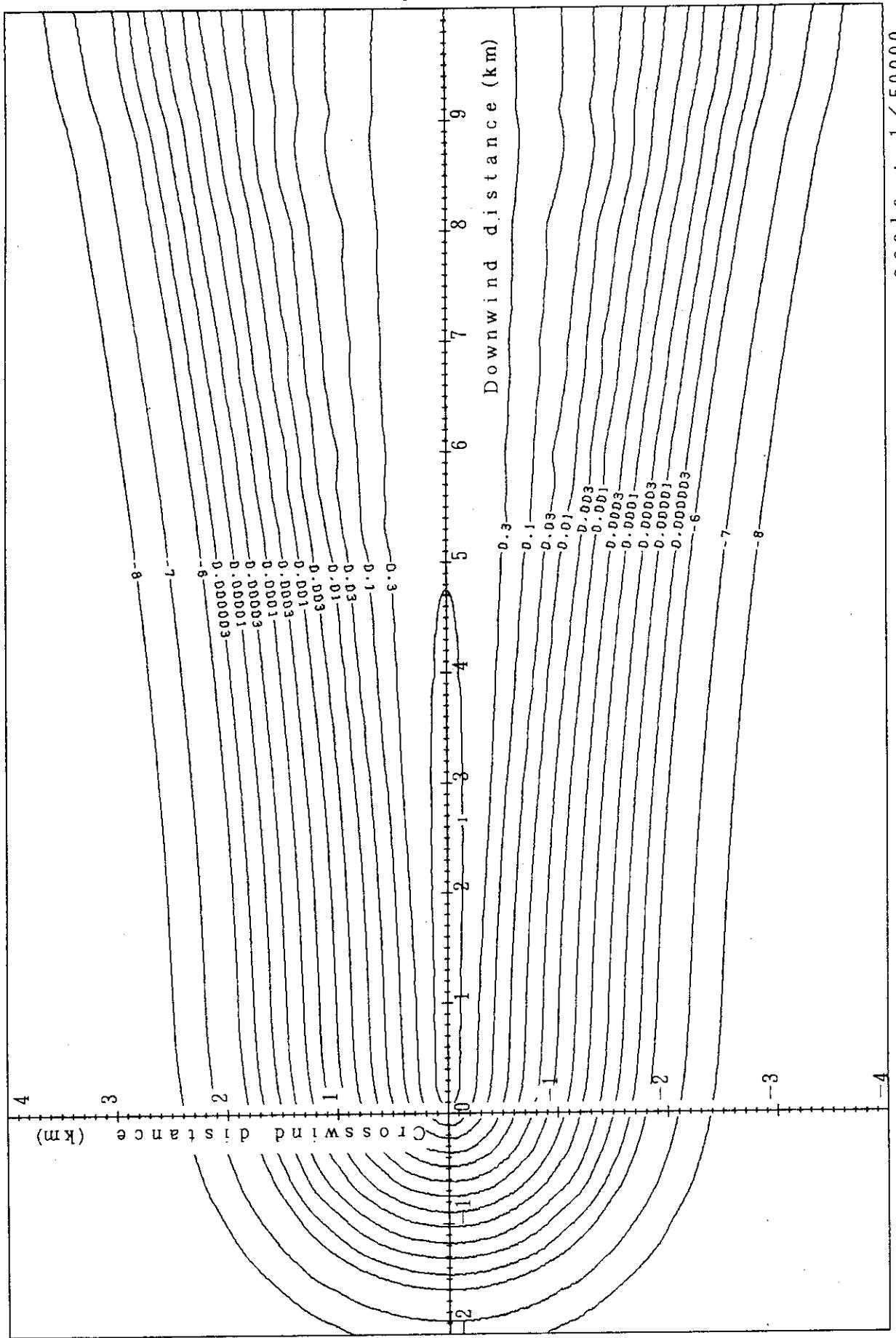
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-10-4 (B) Isopleths of surface exposure rate

scale : 1/50000

1 MeV/d<sup>2</sup>s : 150 m  
1 Ci/h Stack height : 150 m  
1 m/s : 1

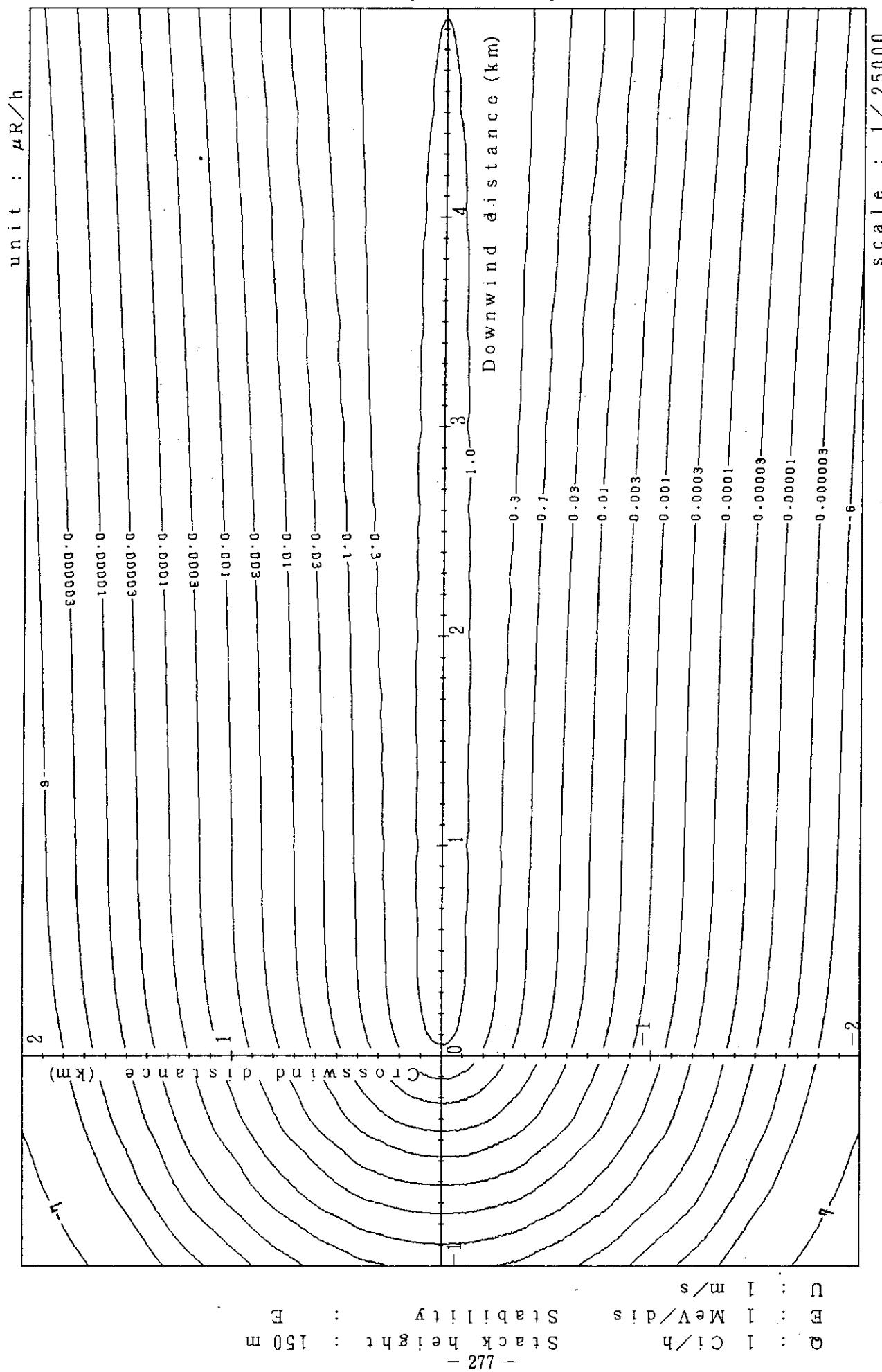


Fig. 4-10-5 (A) Isopleths of surface exposure rate

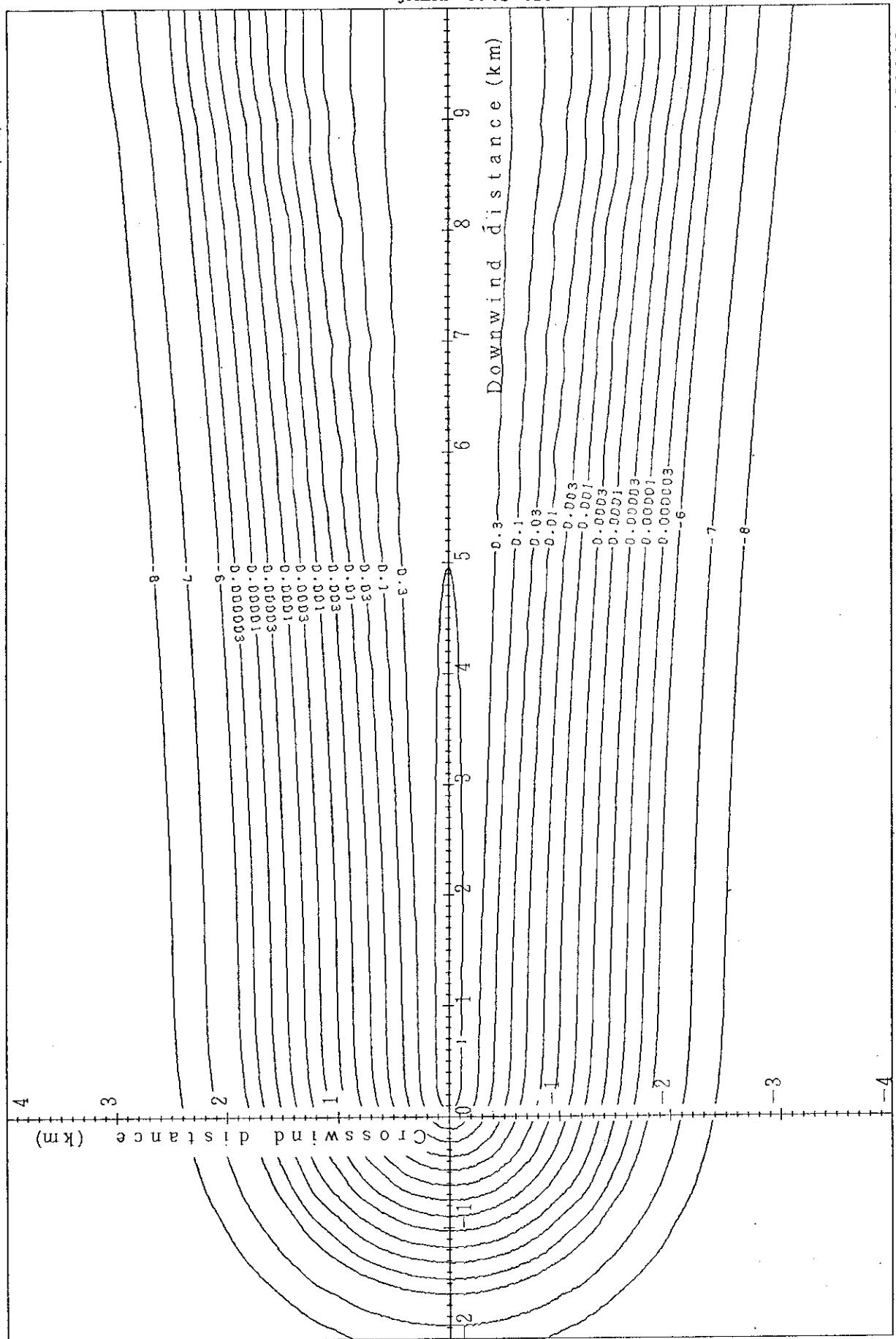
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-10-5 (B) Isopleths of surface exposure rate

scale : 1/50000

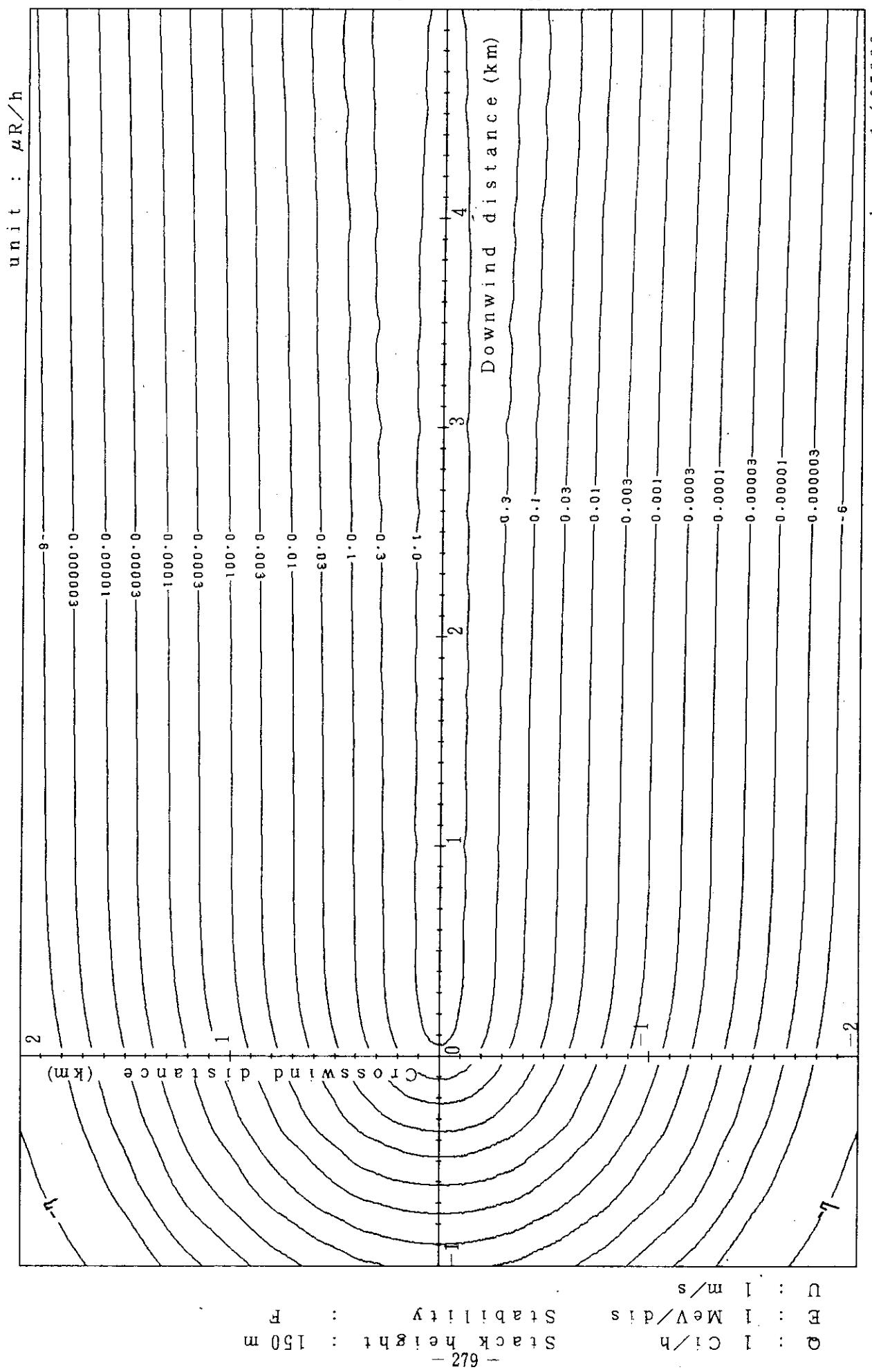


Fig. 4-10-6(A) Isopleths of surface exposure rate

unit :  $\mu\text{R/h}$

JAERI-M 82-021

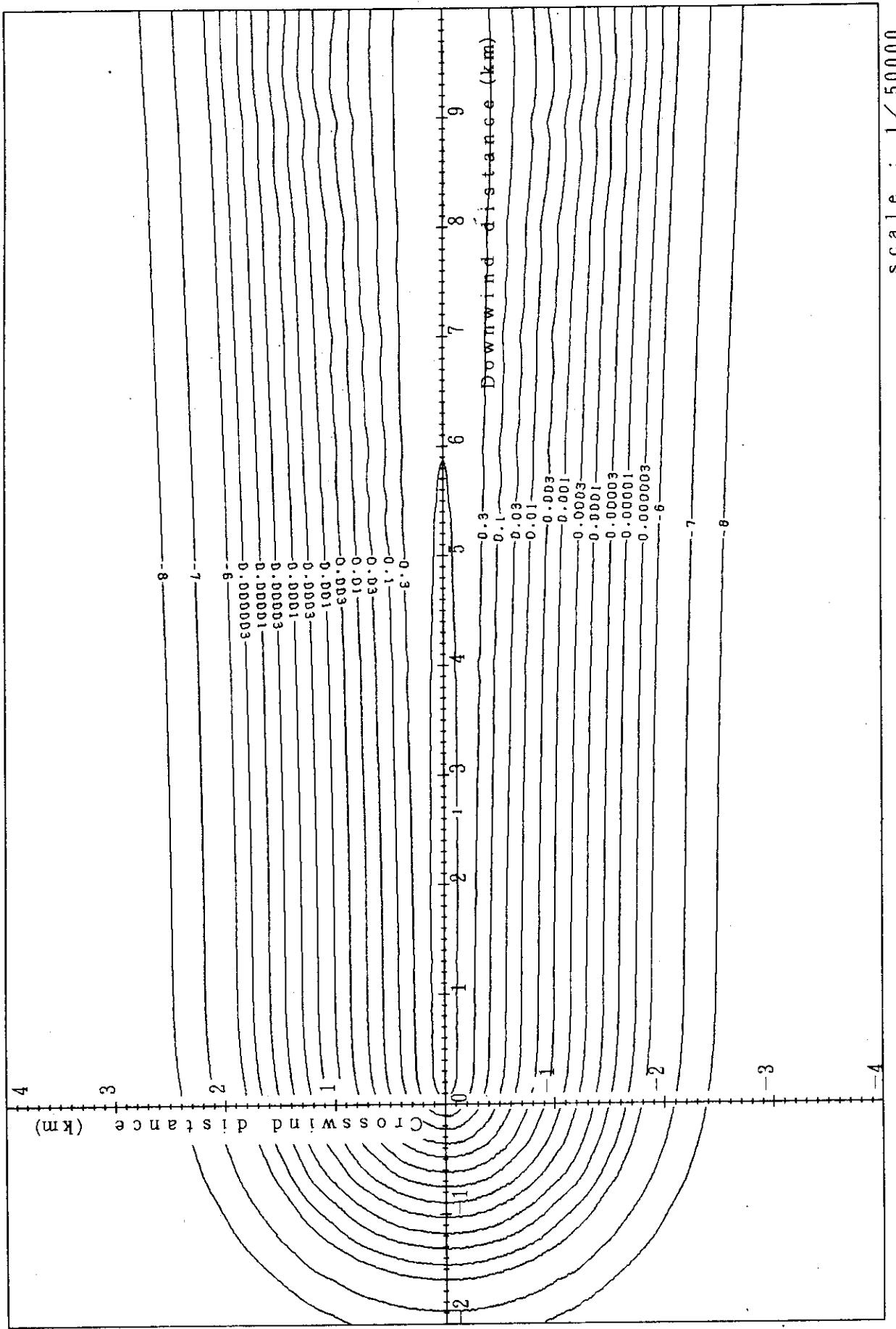


Fig. 4-10-6 (B) Isopleths of surface exposure rate

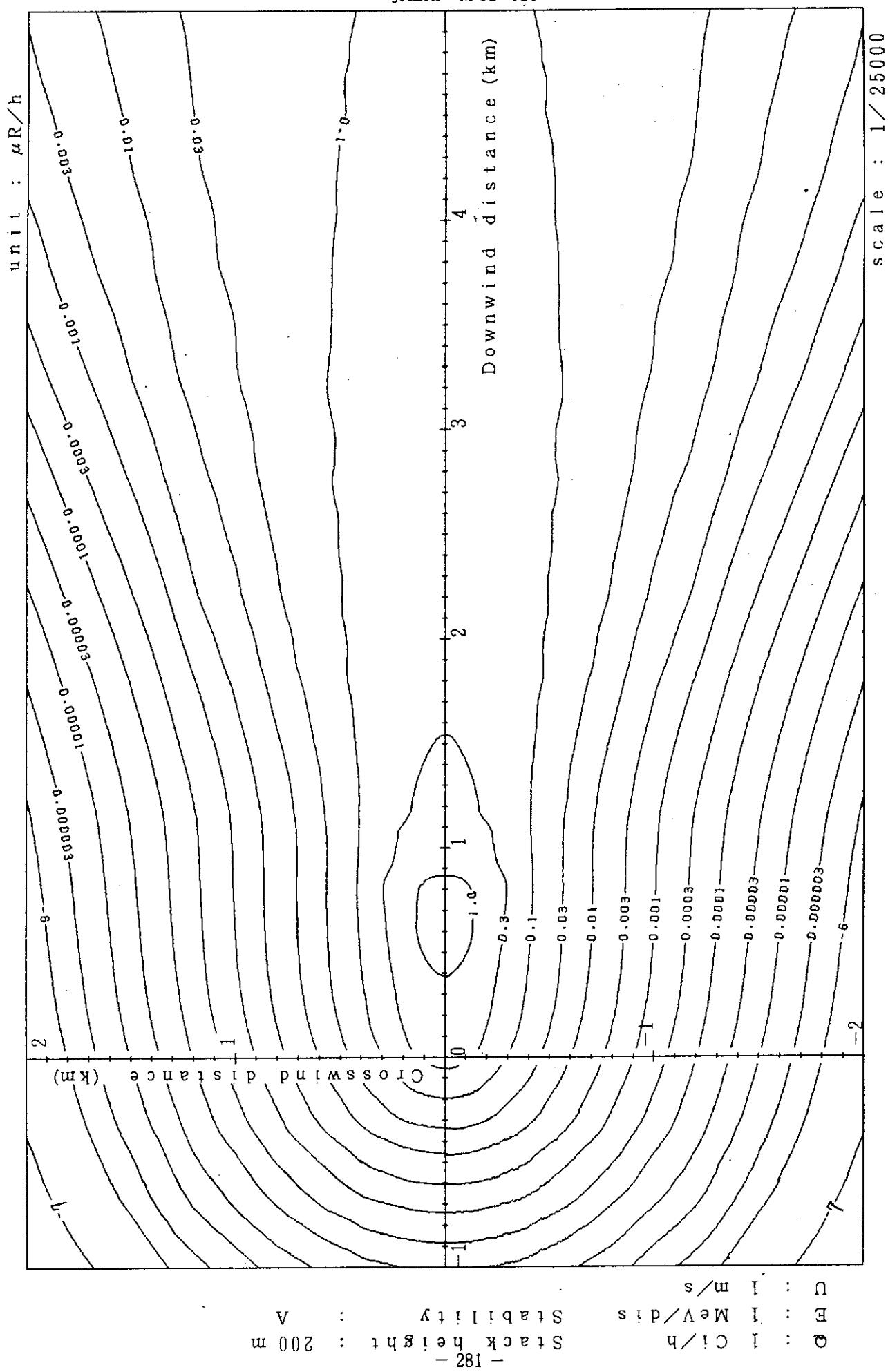


Fig. 4-11-1 (A) Isopleths of surface exposure rate

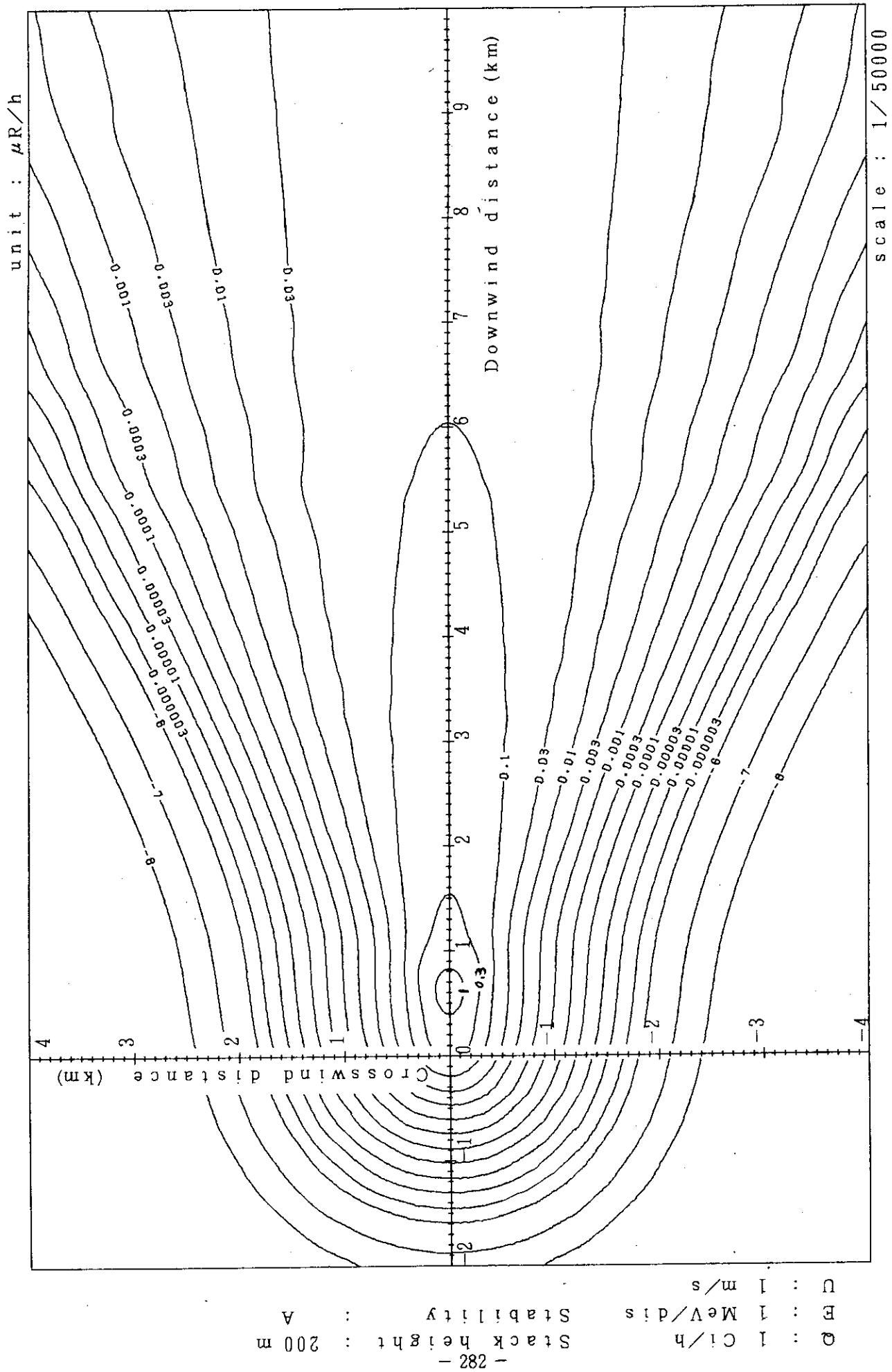


Fig. 4-11-1(B) Isopleths of surface exposure rate

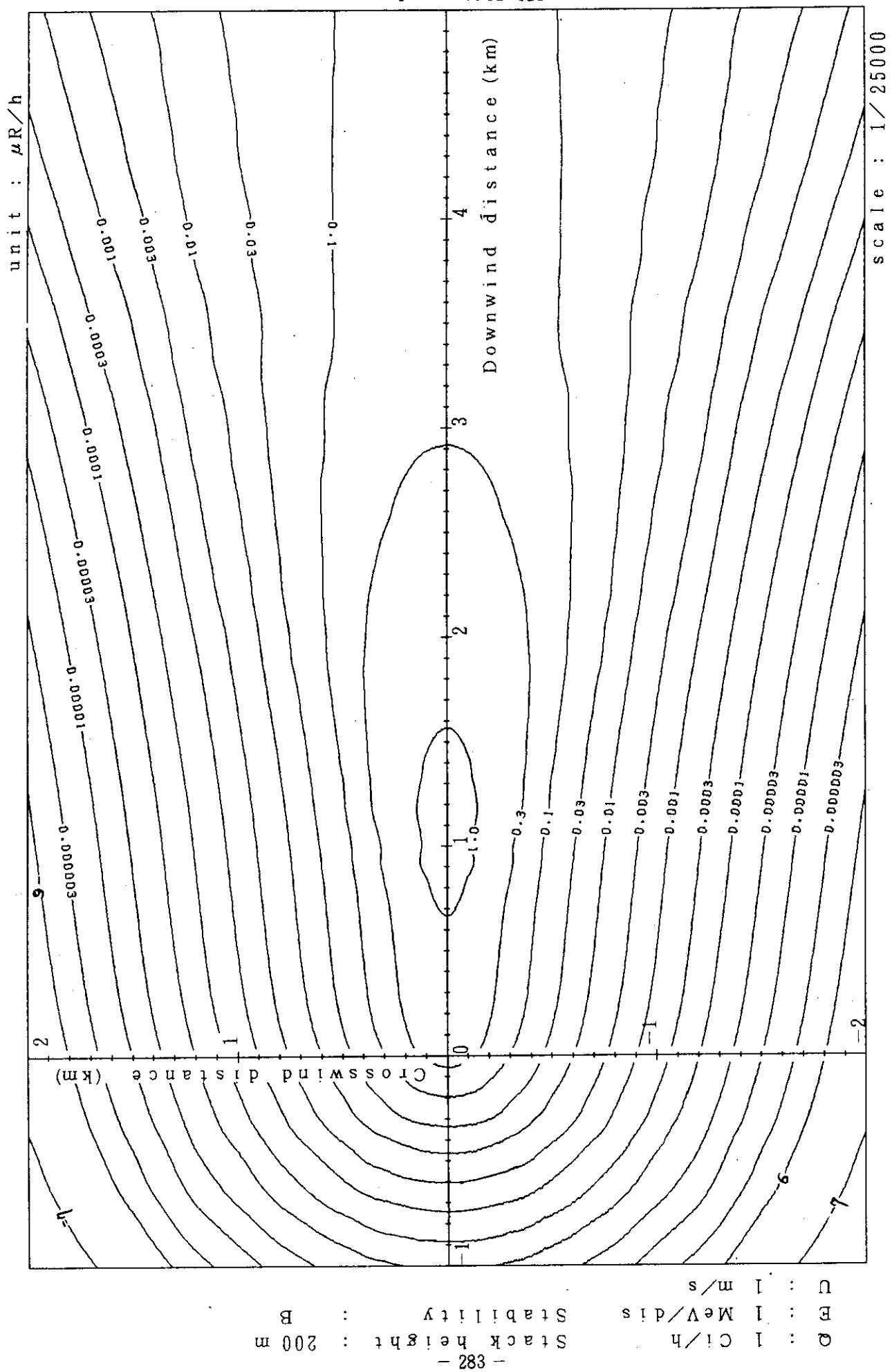


Fig. 4-11-2 (A) Isopleths of surface exposure rate

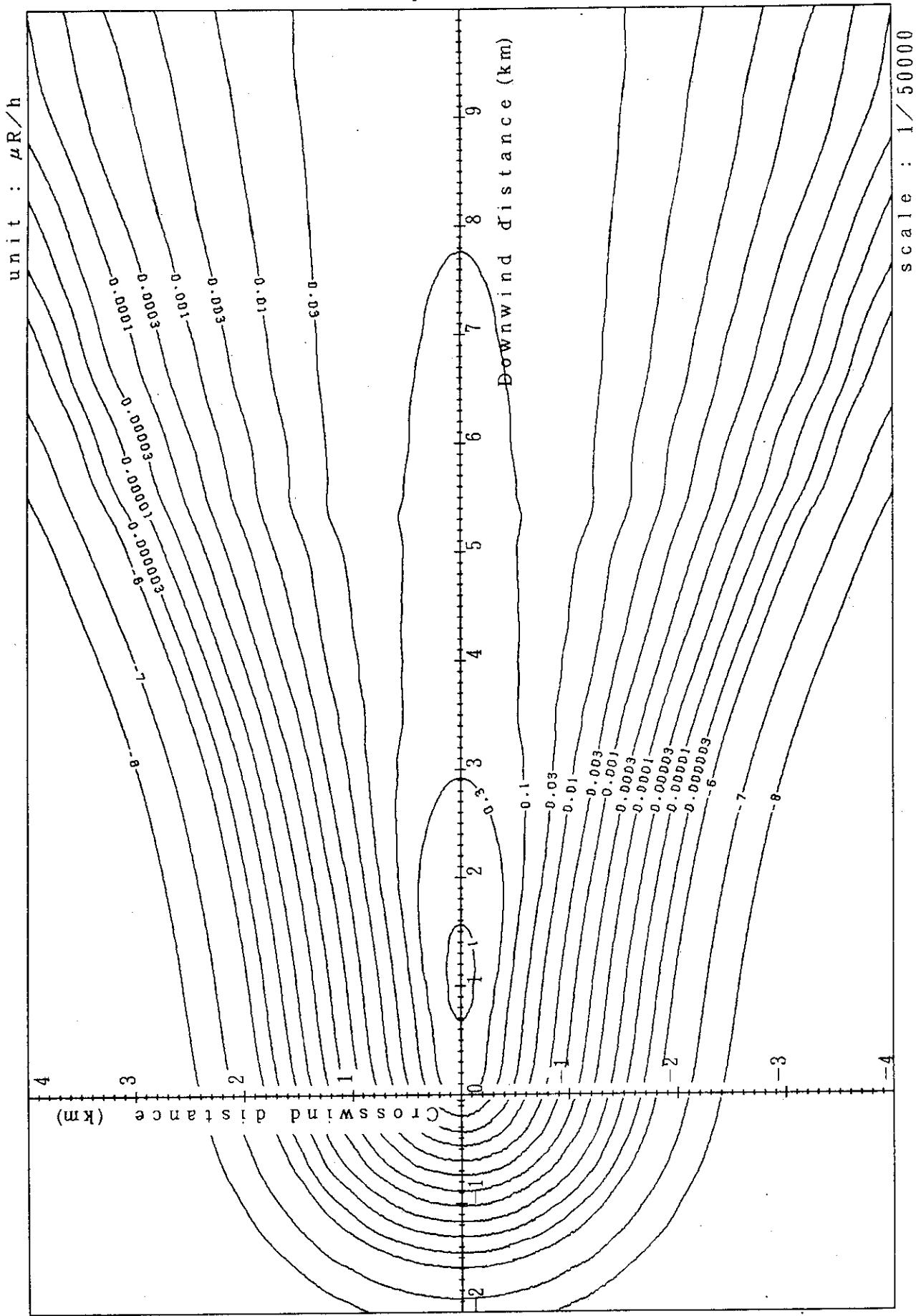


Fig. 4-11-2 (B) Isopleths of surface exposure rate

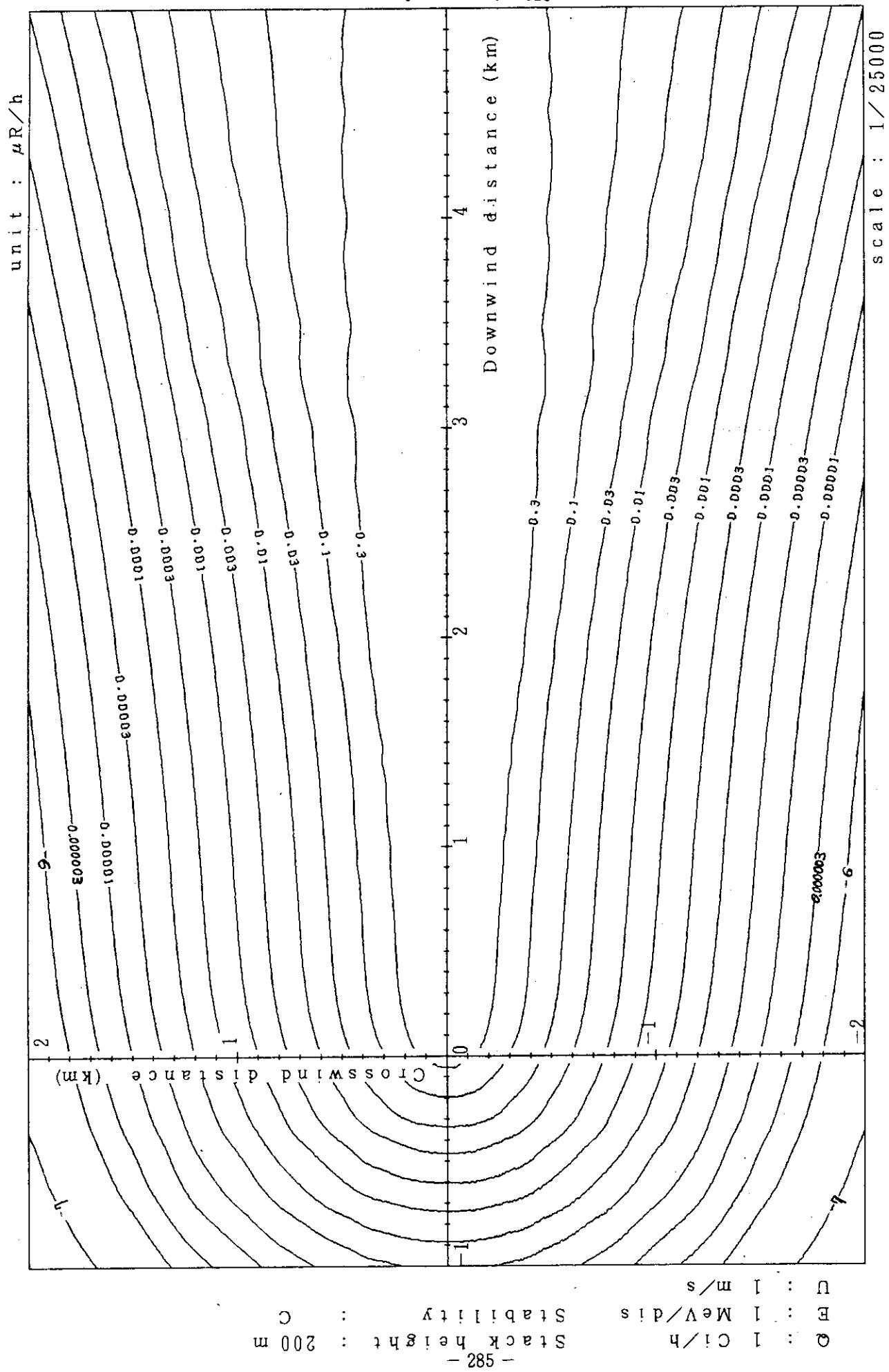


Fig. 4-11-3 (A) Isopleths of surface exposure rate

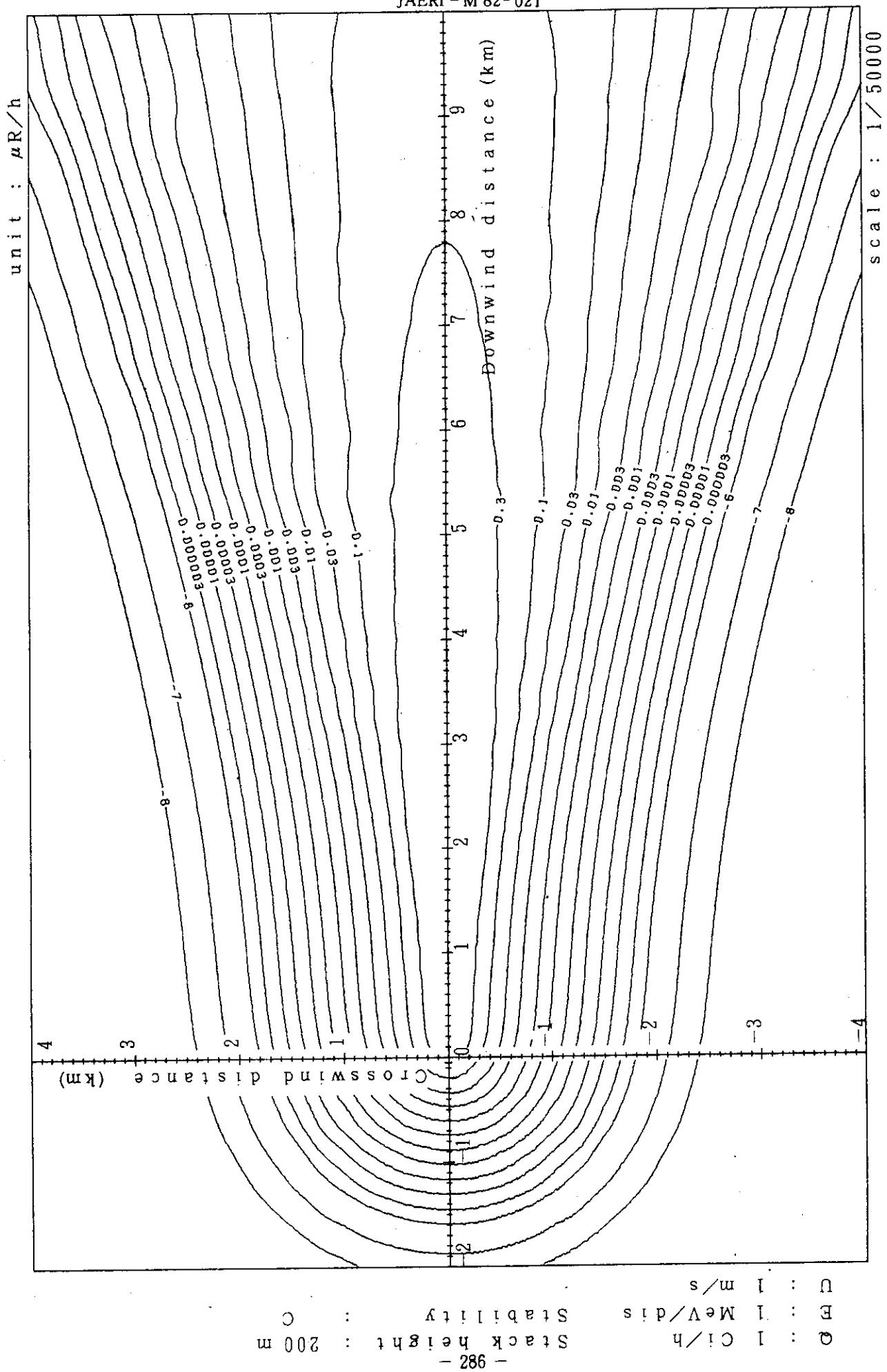


Fig. 4-11-3 (B) Isopleths of surface exposure rate

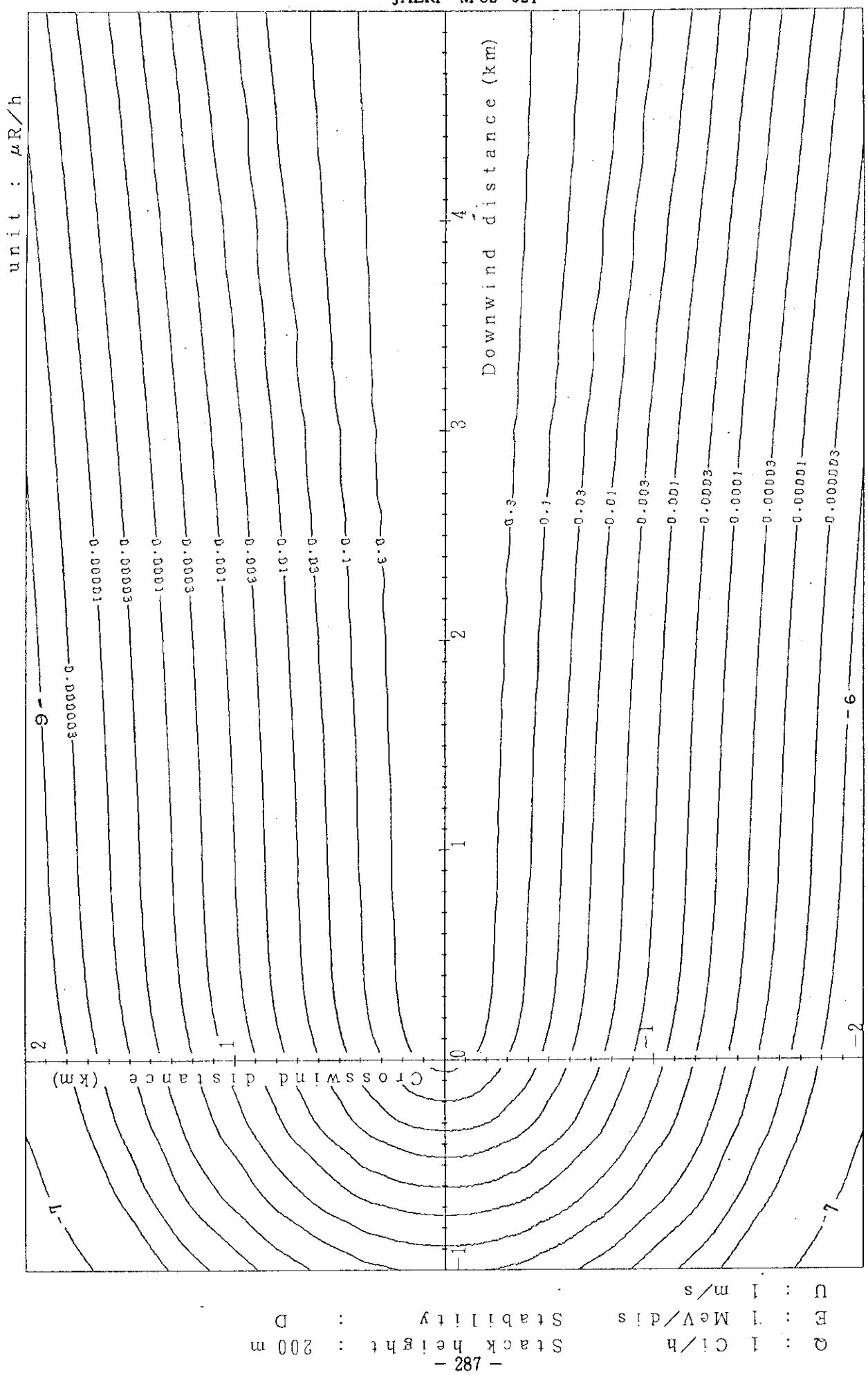


Fig. 4-11-4 (A) Isopleths of surface exposure rate

unit :  $\mu\text{R}/\text{h}$

JAERI-M 82-021

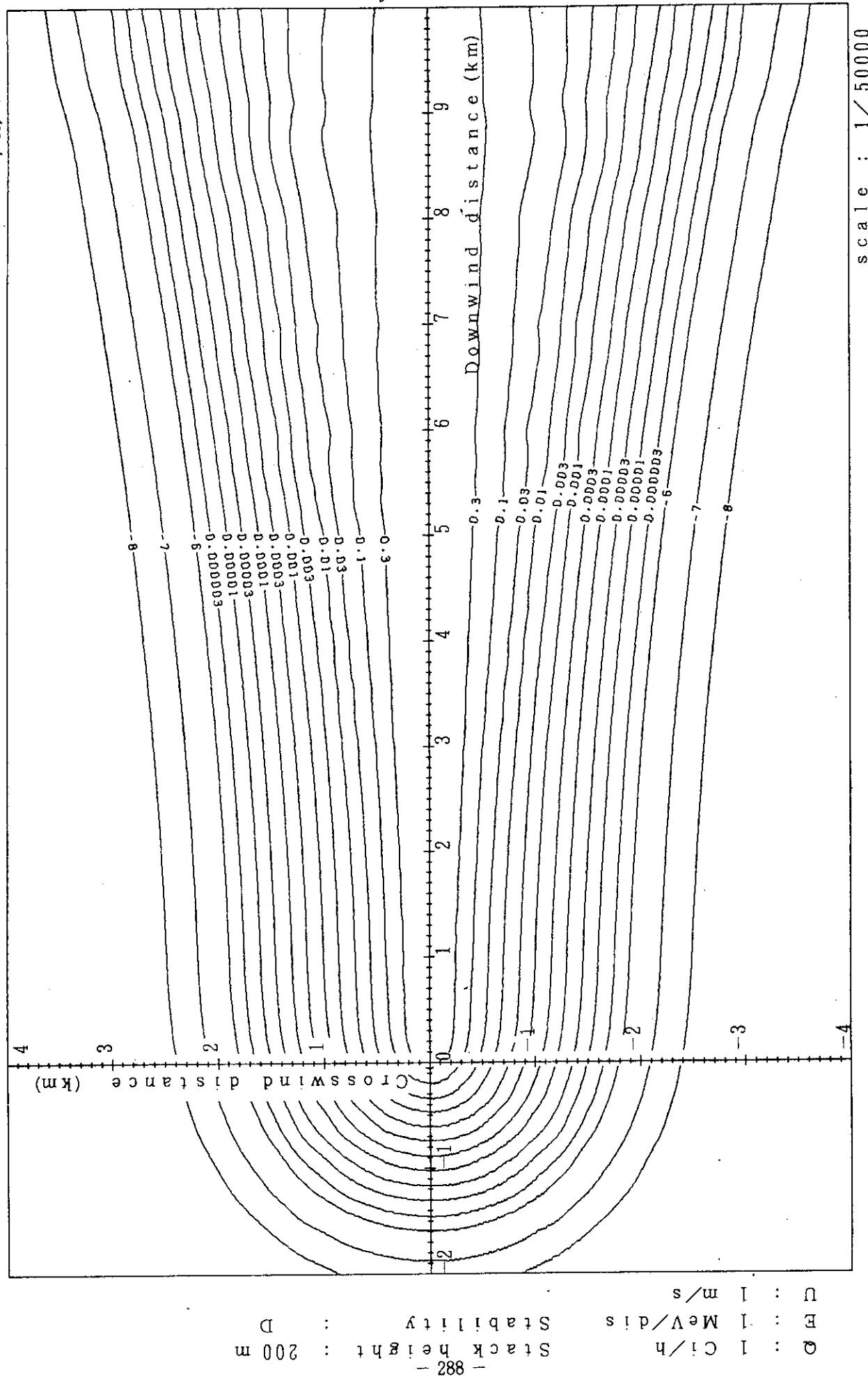


Fig. 4-11-4 (B) Isopleths of surface exposure rate

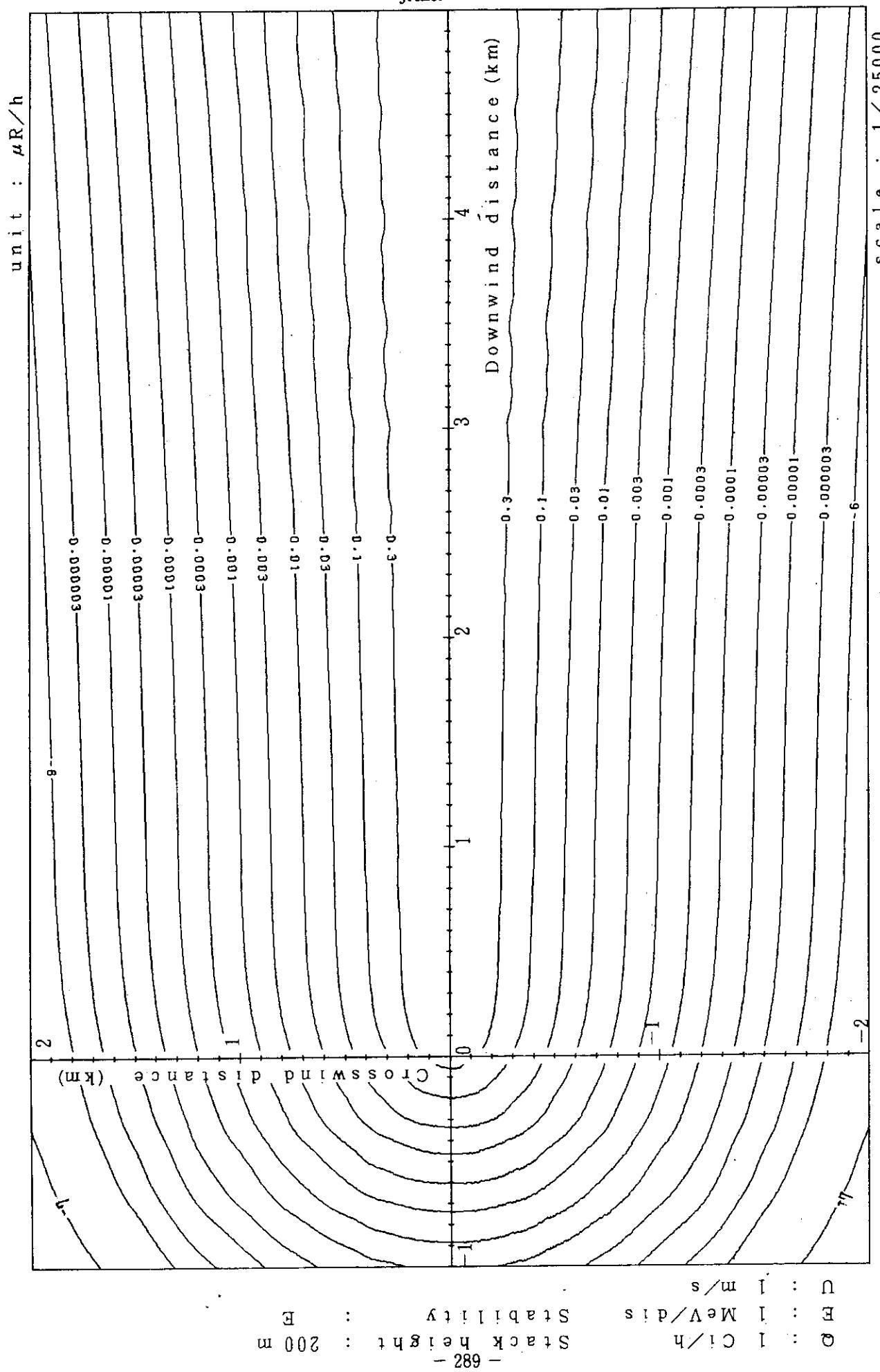


Fig. 4-11-5 (A) Isopleths of surface exposure rate

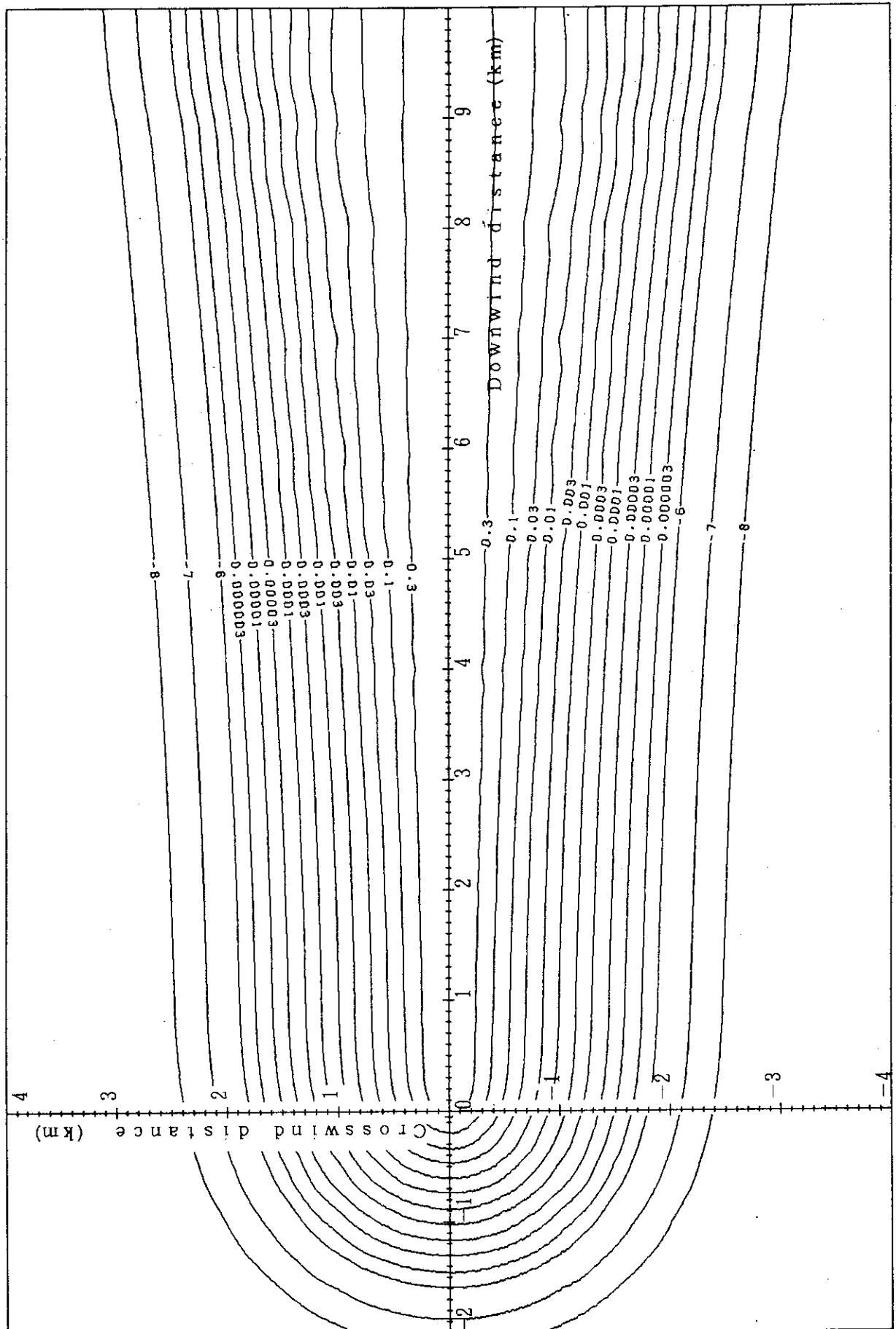
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-11-5 (B) Isopleths of surface exposure rate

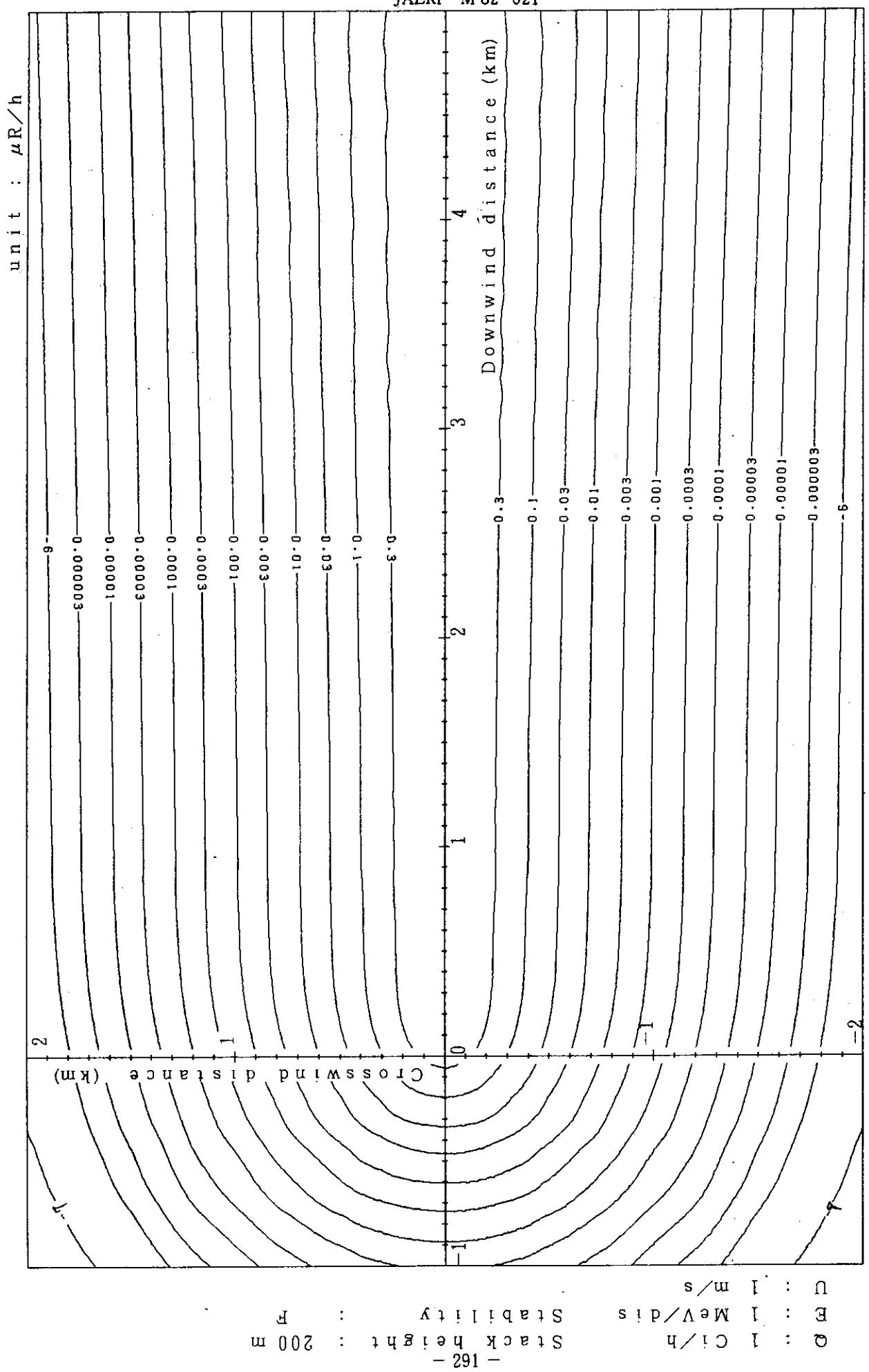


Fig. 4-11-6 (A) Isopleths of surface exposure rate

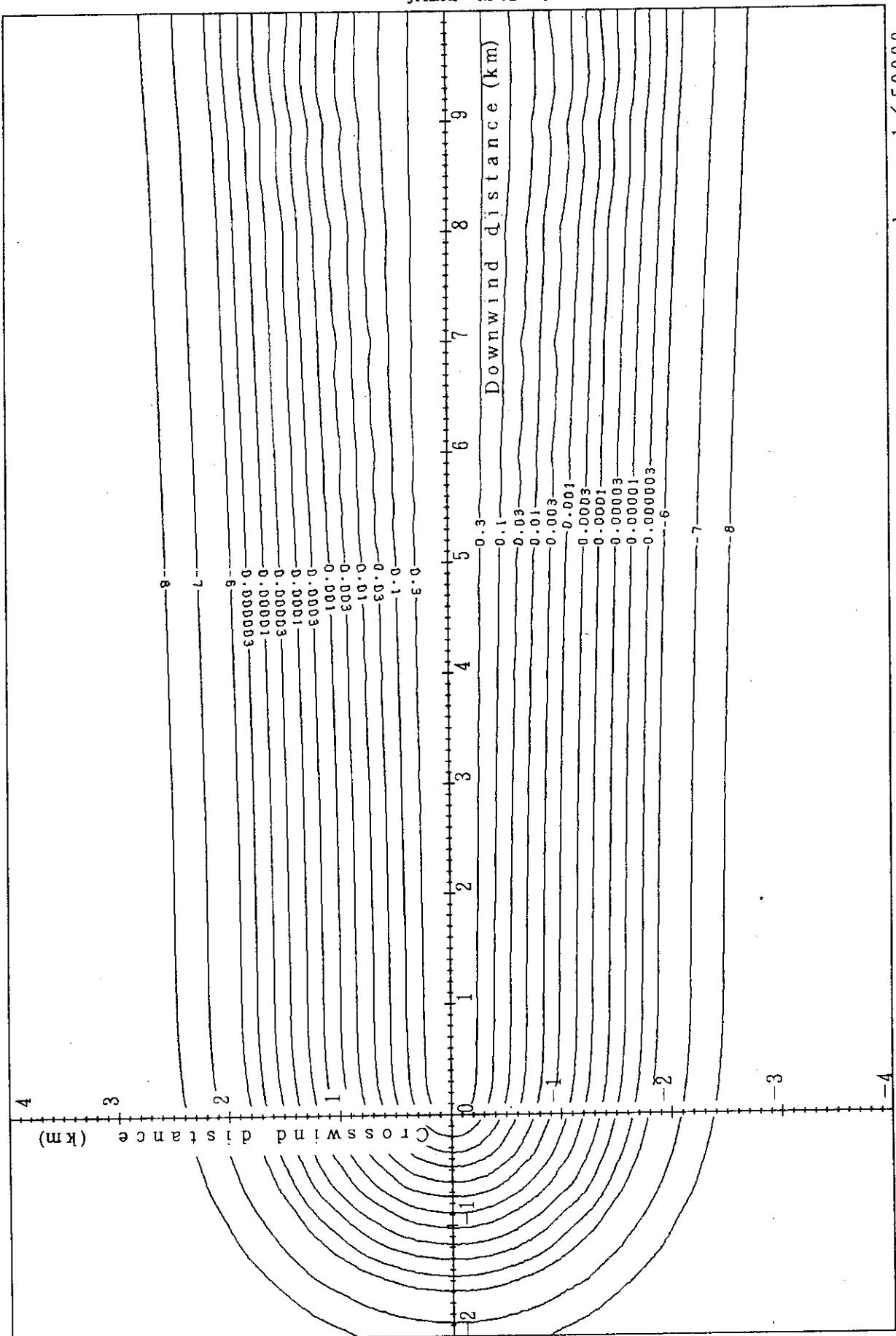
unit :  $\mu\text{R}/\text{h}$ 

Fig. 4-11-6 (B) Isopleths of surface exposure rate

scale : 1/50000

Fig. 4-11-6 (B) Isopleths of surface exposure rate  
 : 1 MeV/dis<sup>-1</sup>  
 : 200 m<sup>2</sup>/s<sup>-1</sup>  
 : 1 Ci/h<sup>-1</sup>  
 : 292