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CONSELHO NACIONAL DE DESENVOLVIMENTO CIENTIFICO E TECNOLÓGICO

(E84-10047) RISE IN THE FREQUENCY OF CLOUD COVER IN LANDSAT DATA FOR THE PERIOD 1973 TO 1981 (Instituto de Pesquisas Espaciais, Sao Jose) 75 p HC A04/MF A01 CSCI 04B

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| Assinatura responsável <i>Francisco José Mendonça</i> | | | |
| 14. Resumo/Notas <i>Utilizando as porcentagens de cobertura de nuvens das imagens do LANDSAT, foram calculadas estatísticas de cobertura de nuvens de modo que se tenha, para cada cena e para cada mês em todo o Brasil, a média de cobertura de nuvens, no período de 1973 a 1981. Foram também calculadas, neste mesmo período e para cada mês, a média da porcentagem de cobertura de nuvem e o valor da porcentagem mínima desta cobertura para as Regiões Norte, Nordeste, Centro-Oeste, Sudeste e Sul, separadamente.</i> | | | |
| 15. Observações | | | |

ABSTRACT

Percentages of cloud cover of LANDSAT imagery were used to calculate the cloud cover monthly average statistic for each LANDSAT scene in Brazil, during the period of 1973 to 1981. The average monthly cloud cover and the monthly minimum cloud cover were also calculated for the regions of north, northeast, central west, southeast and south, separately.

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1 - INTRODUÇÃO

A utilização do LANDSAT está condicionada à disponibilidade de imagens livres de cobertura de nuvens.

É necessário que qualquer trabalho de interpretação de dados do LANDSAT seja precedido de uma análise para verificar as condições de cobertura de nuvens sobre a área de estudo, no período requerido.

Esta necessidade de conhecimento prévio sobre as condições de cobertura de nuvens nos dados do LANDSAT é mais limitante quando tais dados são utilizados para estudo de temas agrícolas. Com efeito, dada a dinâmica dos cultivos dos campos agrícolas ocupados com culturas anuais, torna-se necessário ter informação precisa e antecipada sobre as condições de nebulosidade para o pleno êxito do estudo destas culturas temporárias.

Todavia, dada a aleatoriedade da distribuição espacial das formações de nuvem sobre as diferentes áreas de estudo, um dado importante talvez seja o conhecimento da tendência, ao longo de um período de vários anos, da maior ou menor ocorrência de formação de nuvens sobre uma determinada região.

O presente trabalho tem por objetivo mostrar uma estatística de ocorrência de cobertura de nuvens baseada em imagens do LANDSAT, cobrindo todo o território brasileiro no período de 1973 a 1981.

Naturalmente, não se pretende com este trabalho oferecer um estudo completo de previsão de cobertura de nuvens. Espera-se, entretanto, oferecer, com os dados disponíveis, um quadro, através do qual seja possível definir, para uma dada região, épocas do ano que apresentam maiores chances de haver dados do LANDSAT livres de cobertura de nuvens.

2 - MATERIAL E MÉTODO

Os satélites da série LANDSAT cobrem todo o território brasileiro, conforme mostra a Figura 2.1.

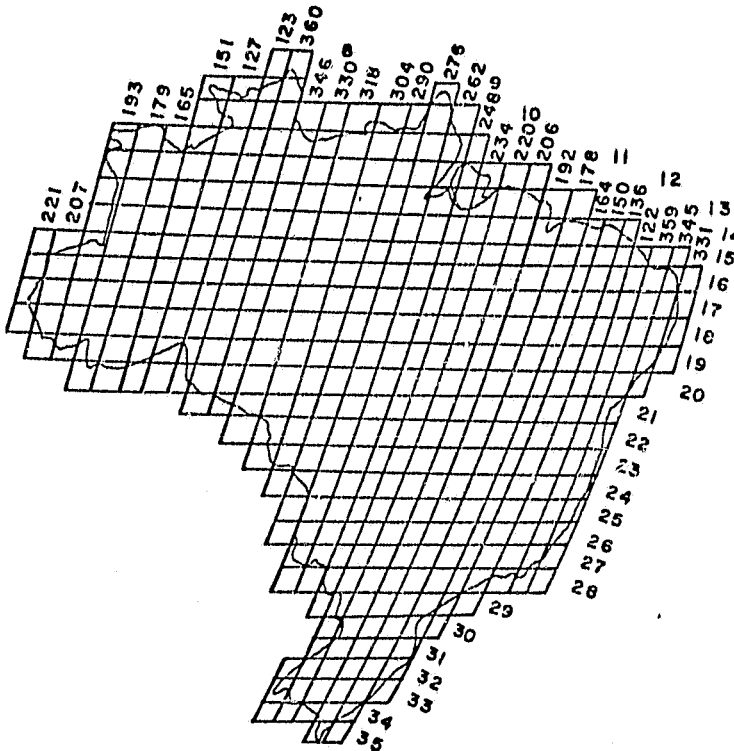


Fig. 2.1 - Mapa índice da cobertura do LANDSAT com as órbitas (números verticais) e pontos (números horizontais).

Os dados correspondentes aos valores de percentagem de cobertura de nuvens de cada órbita/ponto, referente ao período de 1973 a 1981, foi obtido junto ao Laboratório de Processamento de Imagem, do Departamento de Geração de Imagens do INPE, em Cachoeira Paulista.

Tais valores foram digitalizados e armazenados em fitas compatíveis com computador. A seguir, foram calculadas as estatísticas de cobertura de nuvens, de modo a haver para cada ponto e para cada mês a média de cobertura de nuvens no período acima indicado.

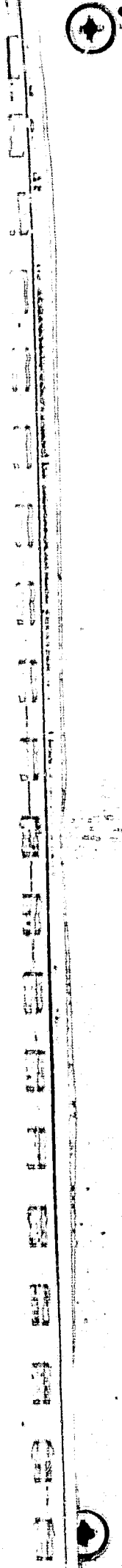
A seguir, fez-se um agrupamento dos dados e determinaram-se quatro classes de cobertura de nuvens, segundo os seguintes intervalos:

| CLASSE | INTERVALOS DE COBERTURA DE NUVEM (%) |
|--------|---|
| I | 0 - 15 |
| II | 16 - 30 |
| III | 31 - 60 |
| IV | 61 - 100 |

Sobre o mapa do Brasil que contém a grade representativa de cada órbita/ponto foram associados, a cada classe, os meses nos quais as percentagens de cobertura de nuvem situavam-se nos intervalos especificados acima.

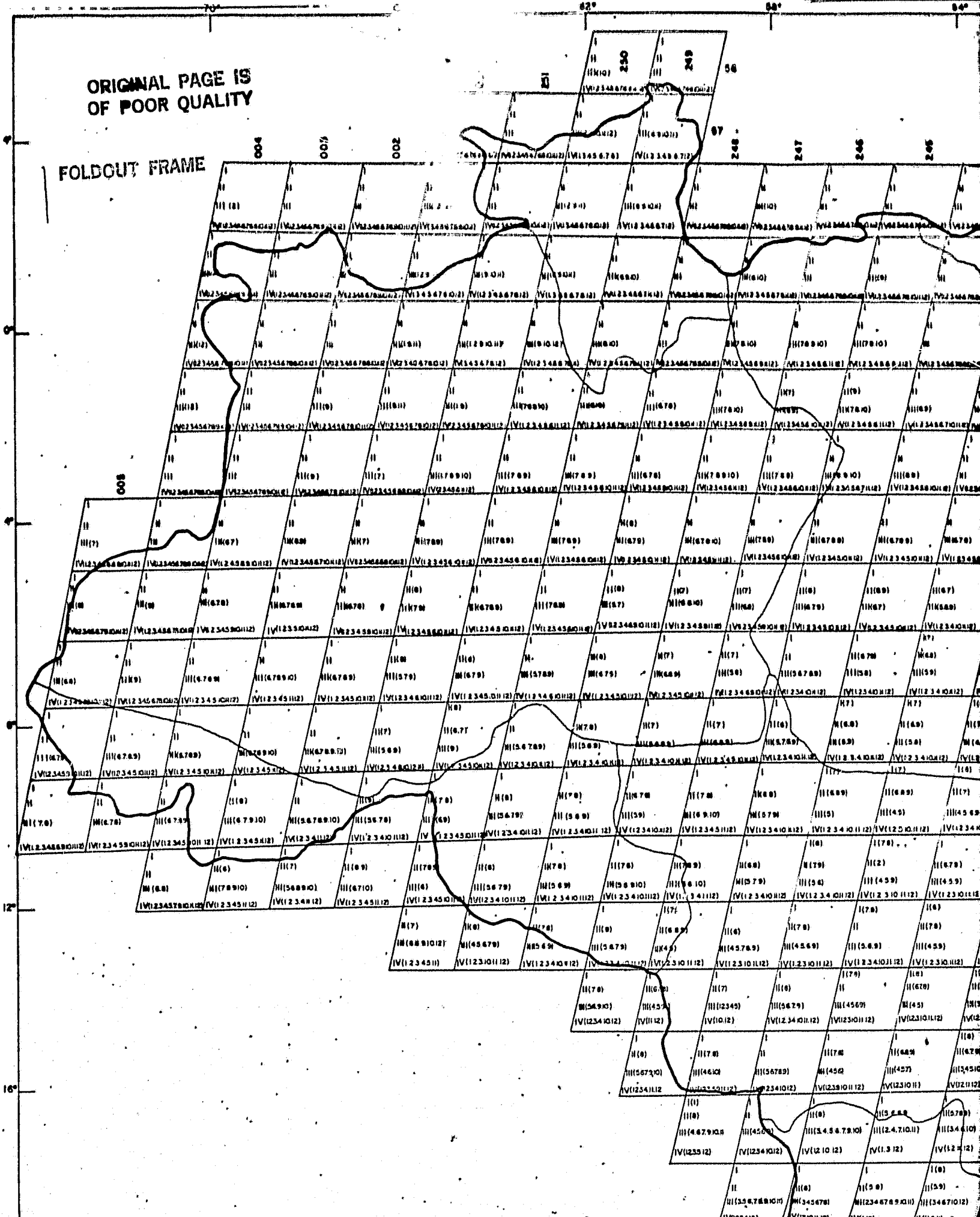
Elaborou-se também para cada região (Norte, Nordeste, Centro-Oeste, Sudeste, Sul) um mapa com a grade representativa de cobertura do LANDSAT. Sobre este mapa estão plotados, para cada mês, a média da percentagem de cobertura de nuvens no período de 1973 a 1981 e o valor da percentagem mínima de cobertura de nuvens ocorrida durante todo o período.

A seguir Mapa de Cobertura de Nuvens



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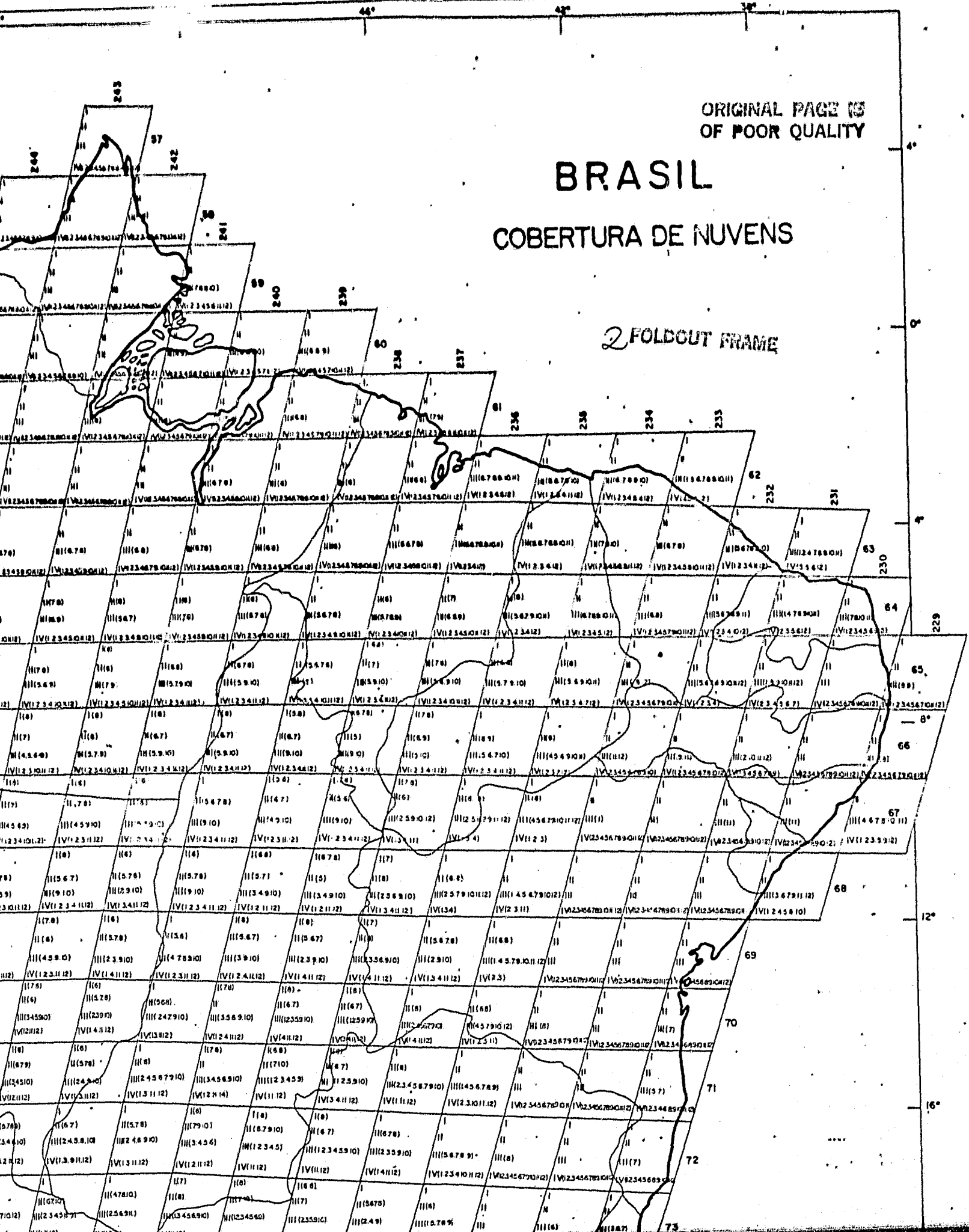


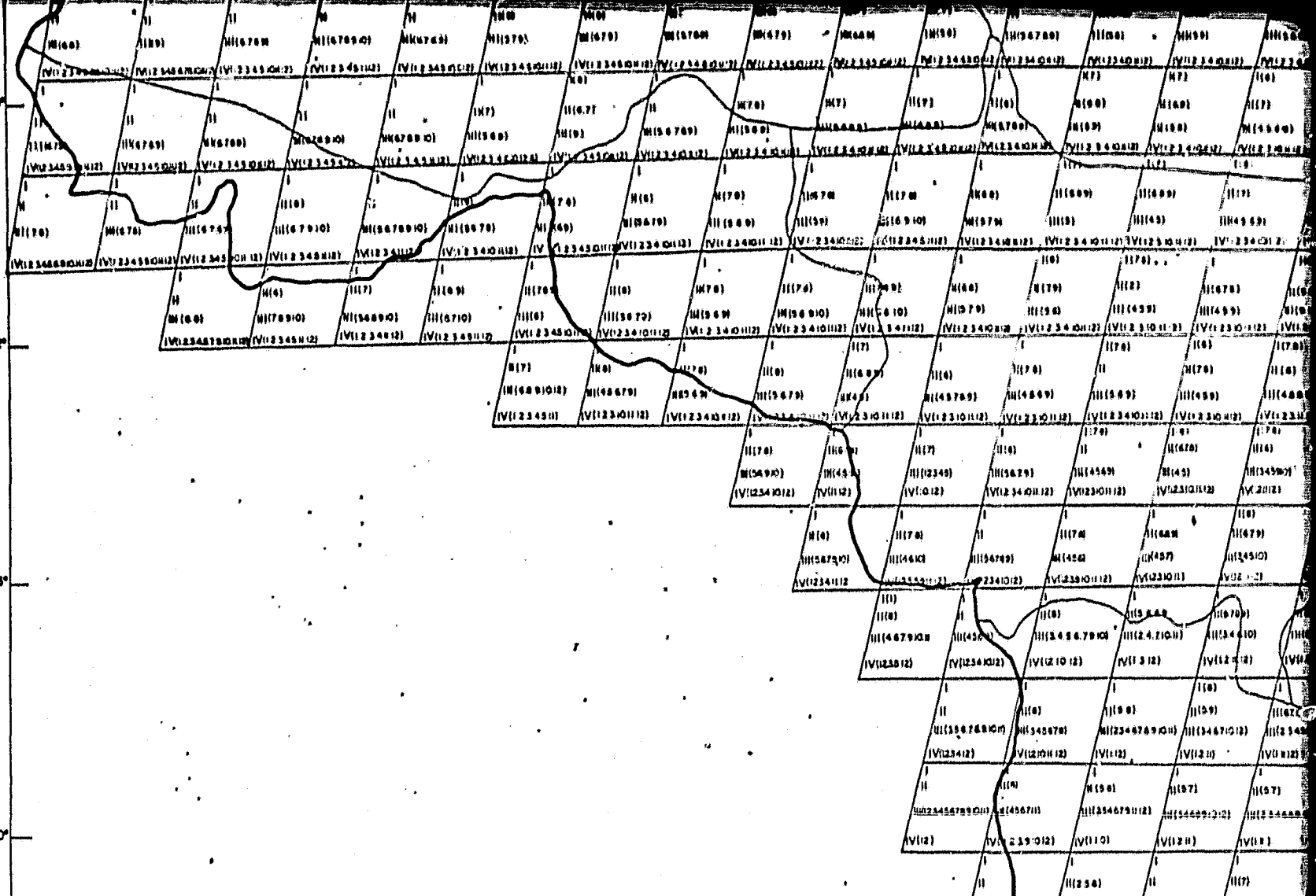
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BRASIL

COBERTURA DE NUVENS

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FREQUÊNCIA DOS SISTEMAS NUBLOSOS

COM BASE NAS INFORMAÇÕES EXTRAÍDAS DAS IMAGENS LANDSAT MSS
PERÍODO DE 1973 A 1981

ESCALA 1:5000.000

LEGENDA

ÍNDICE DE COBERTURA

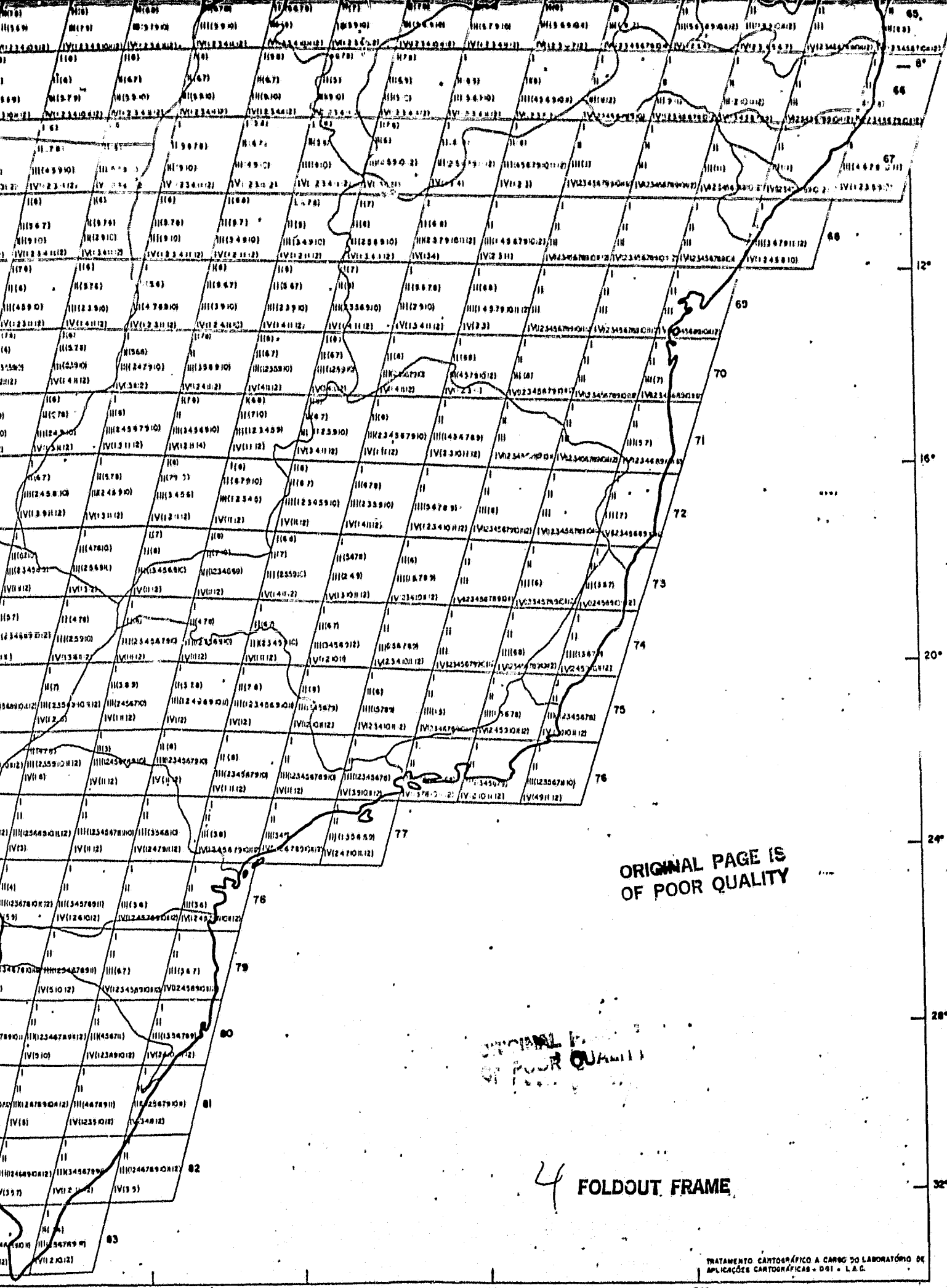
- I = 0 - 18 (Ótimo)
- II = 18 - 30 (Bom)
- III = 30 - 60 (Ruim)
- IV = 60 - 100 (Péssimo)

MESES

1 2 3 4 5 6 7 8 9 10 11 12
 JAN. FEV. MAR. ABR. MAI. JUN. JUL. AGO. SET. OUT. NOV. DEZ.

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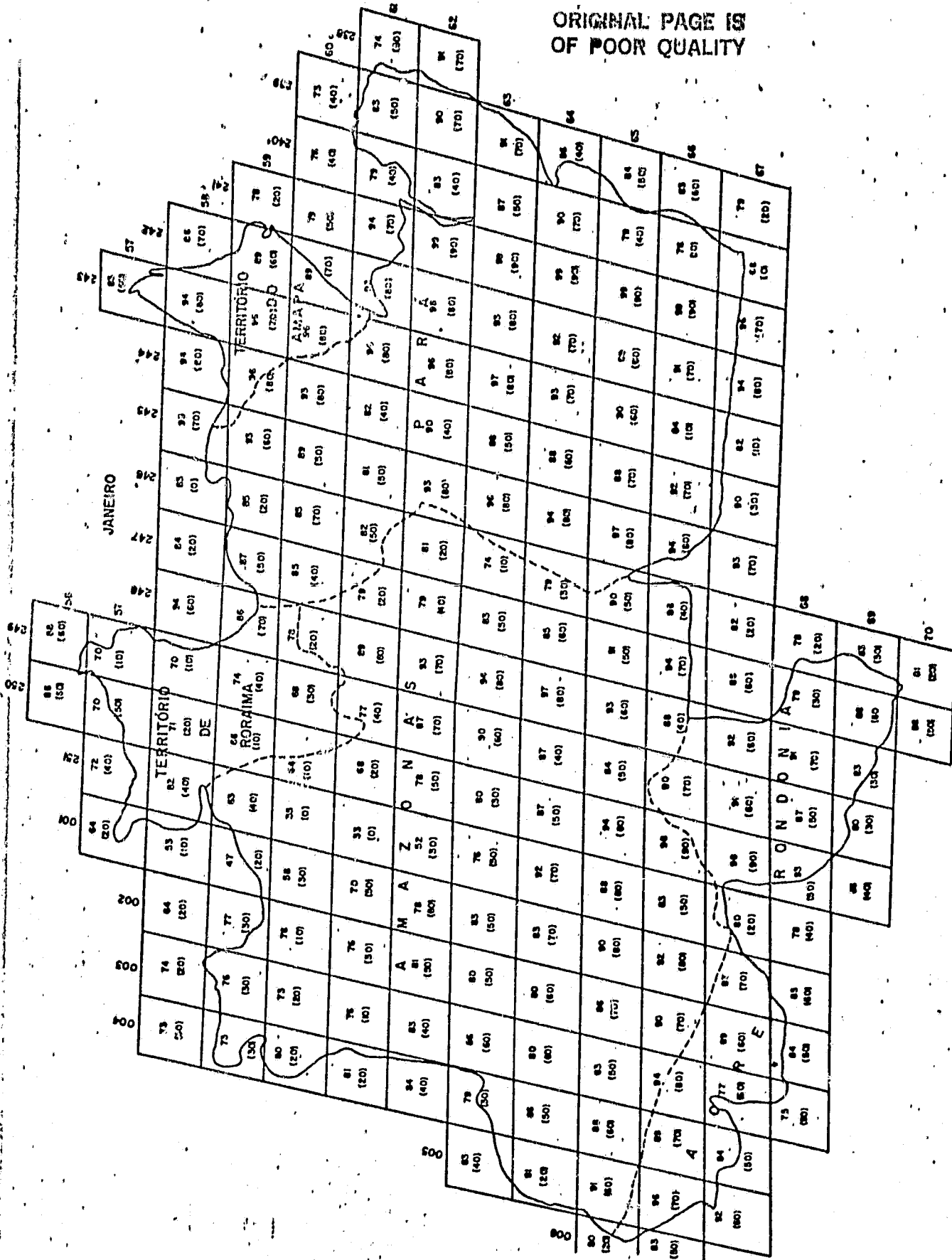
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REGIÃO NORTE

LEGENDA

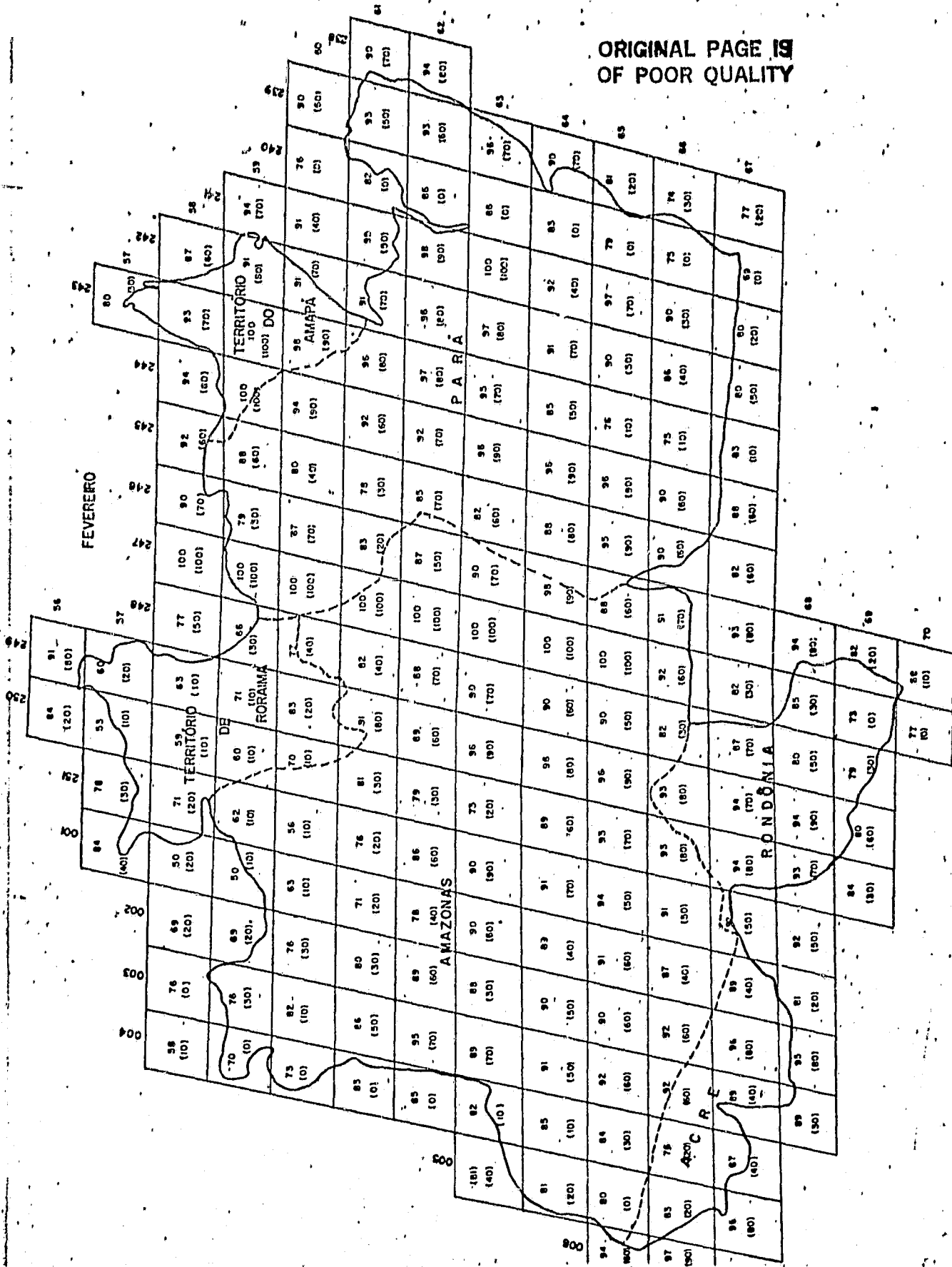
- A - Valor da média das percentagens de cobertura de nuvens no período de 1973 a 1981.
- (A) - Valor da percentagem mínima de cobertura de nuvens ocorrida no período de 1973 a 1981.

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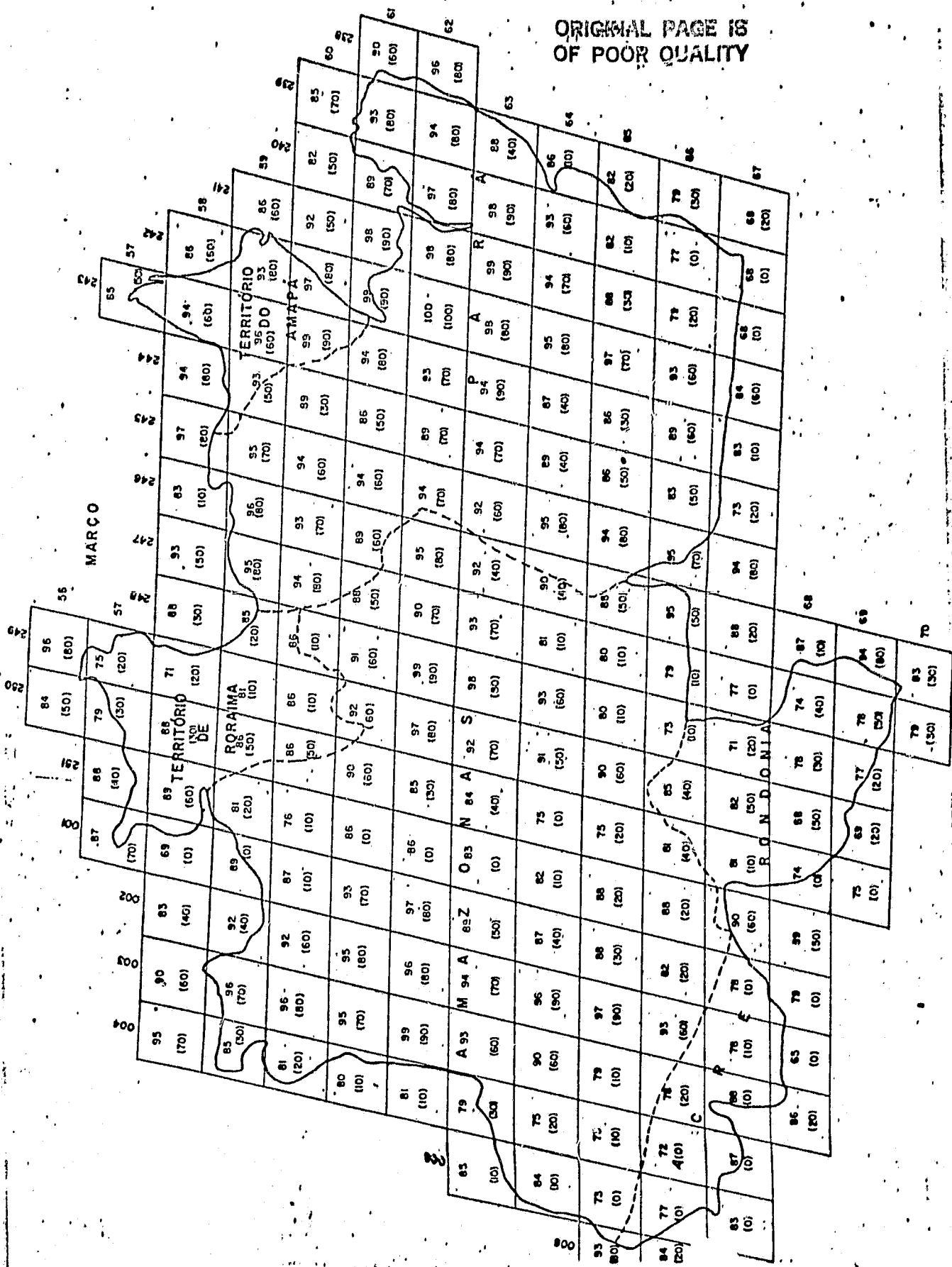


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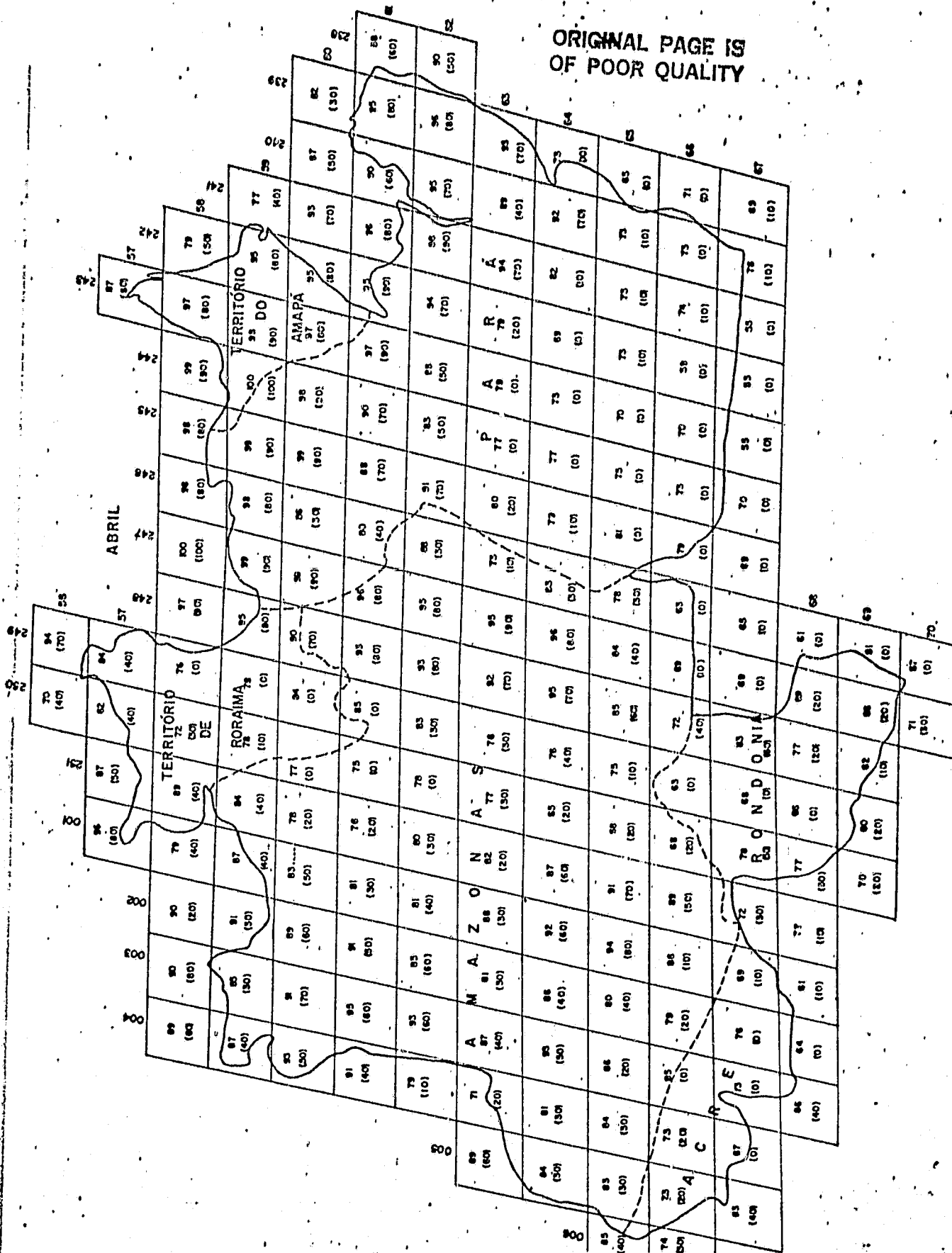
FEVEREIRO



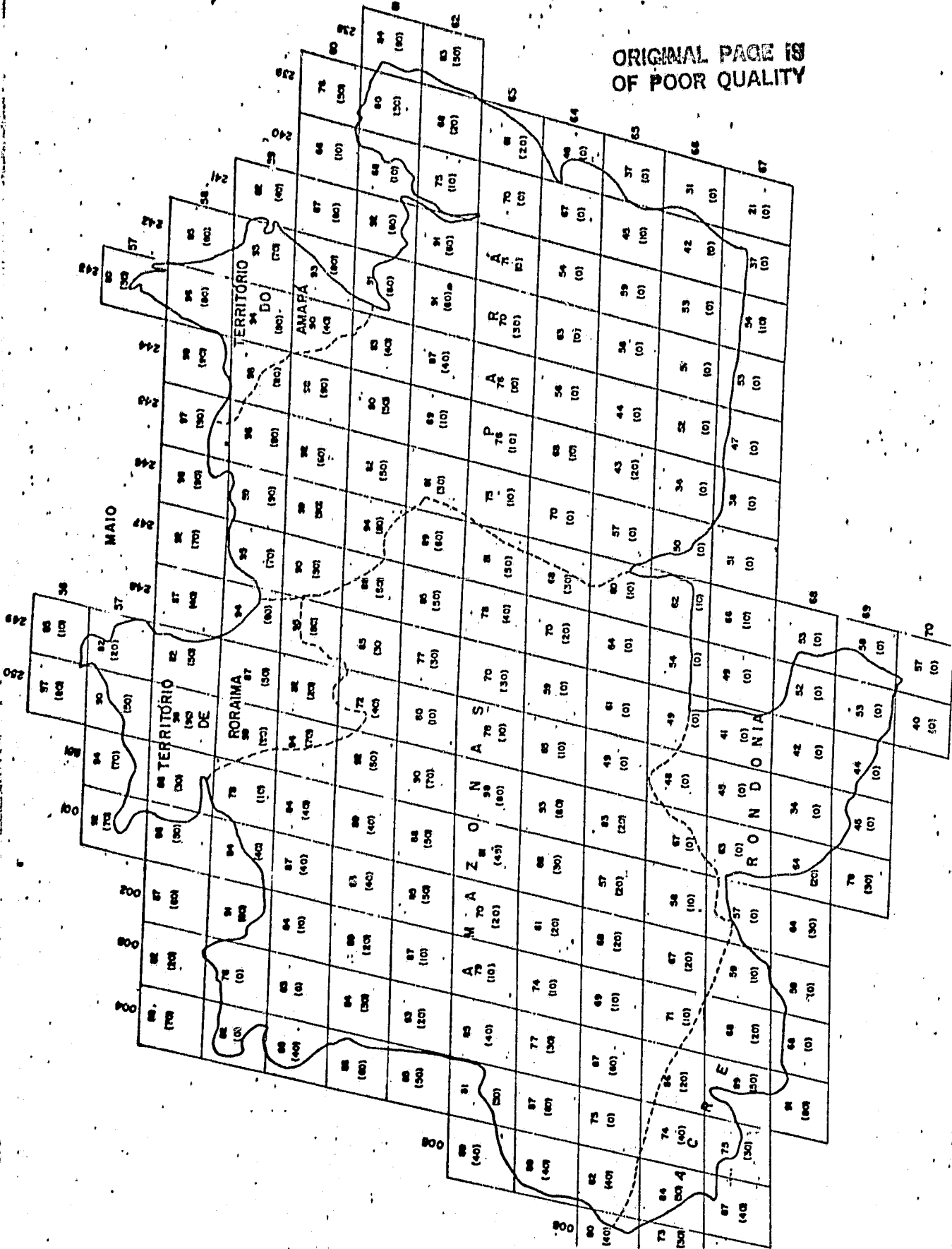
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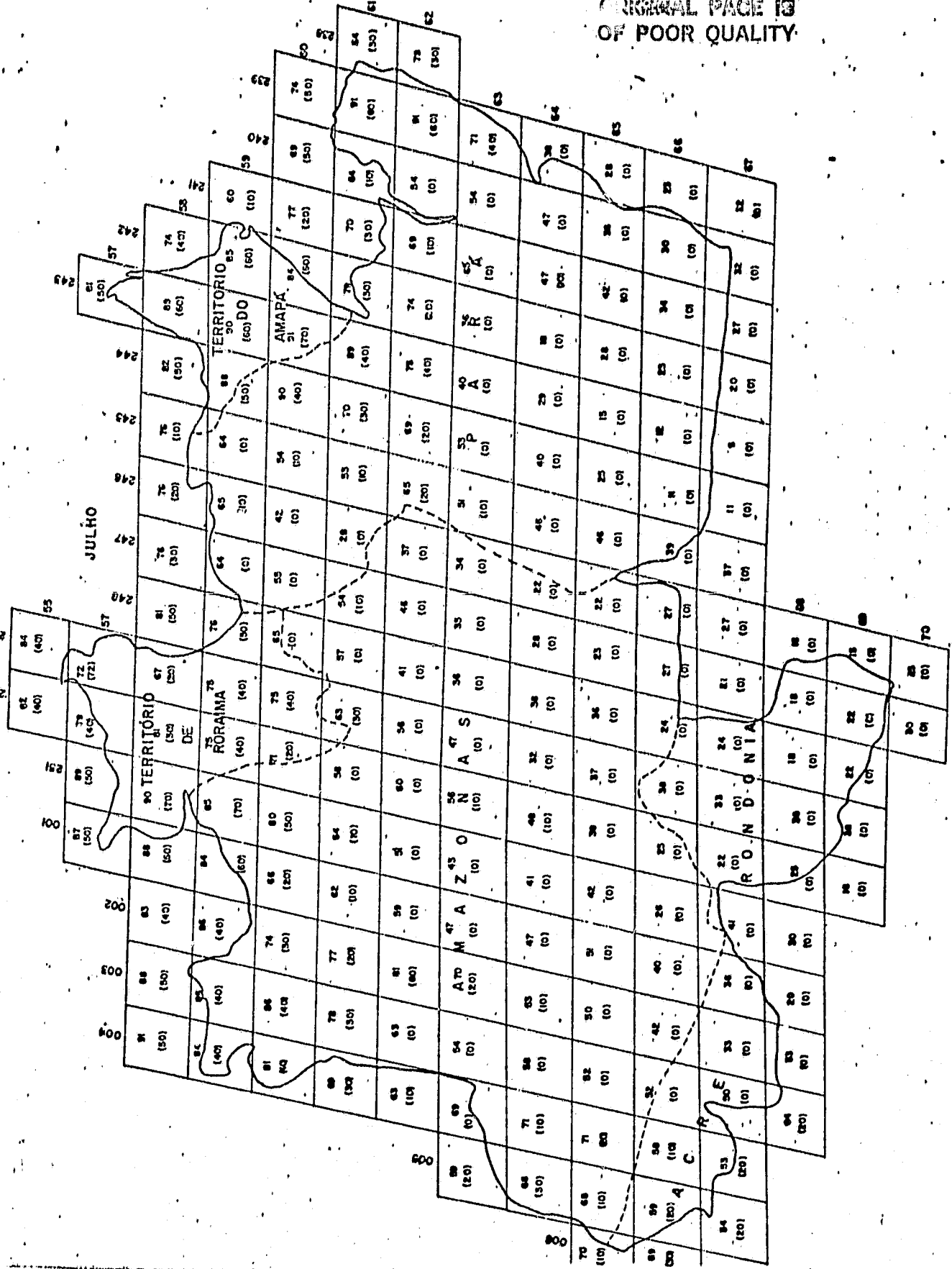
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A grid map of Brazil's states and territories. The grid has columns labeled with state abbreviations and rows labeled with numbers. Dashed lines outline state boundaries. The word "JUNHO" is written vertically on the left side. The map includes the following states and territories:

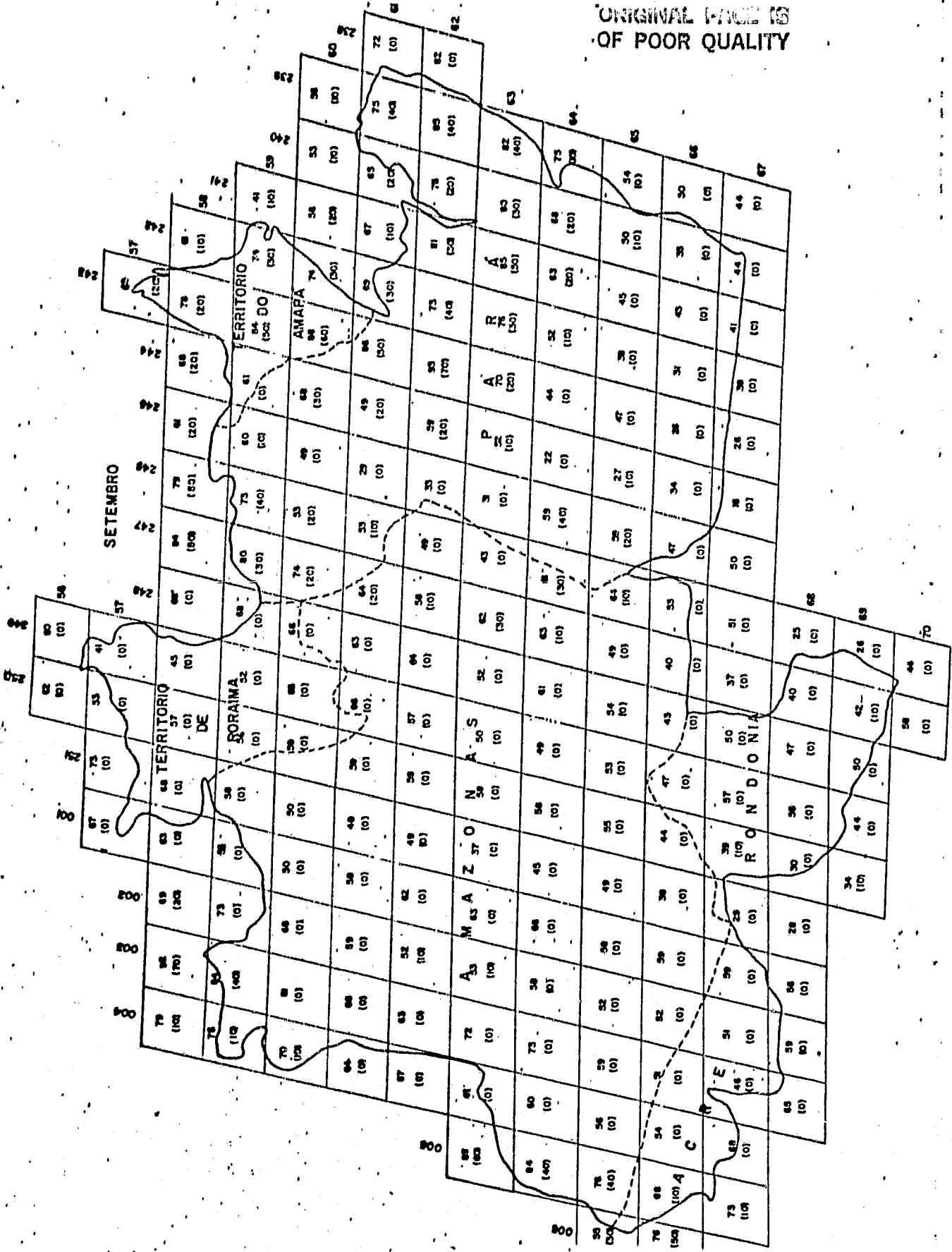
- AMAPÁ
- ARRIAËS
- BAHIA
- CEARÁ
- ESPÍRITO SANTO
- GOIÁS
- MINAS GERAIS
- PARANÁ
- PARANÁ DO SUL
- PERNAMBUCO
- PÍSCATA
- RIO DE JANEIRO
- RIO GRANDE DO NORTE
- SÃO PAULO
- TOCANTINS
- TERRETORIO DO PIAUÍ
- TERRETORIO DE RORAIMA
- TERRETORIO FEDERAL DO AMAPÁ

The grid is divided into cells containing alphanumeric codes. The columns are labeled with abbreviations: AM, AR, BA, CE, ES, GO, MI, PA, PS, PE, PI, RJ, RN, SP, TO. The rows are labeled with numbers: 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70. Each cell contains a two-digit number followed by a number in parentheses, such as "34 (50)".

JULHO



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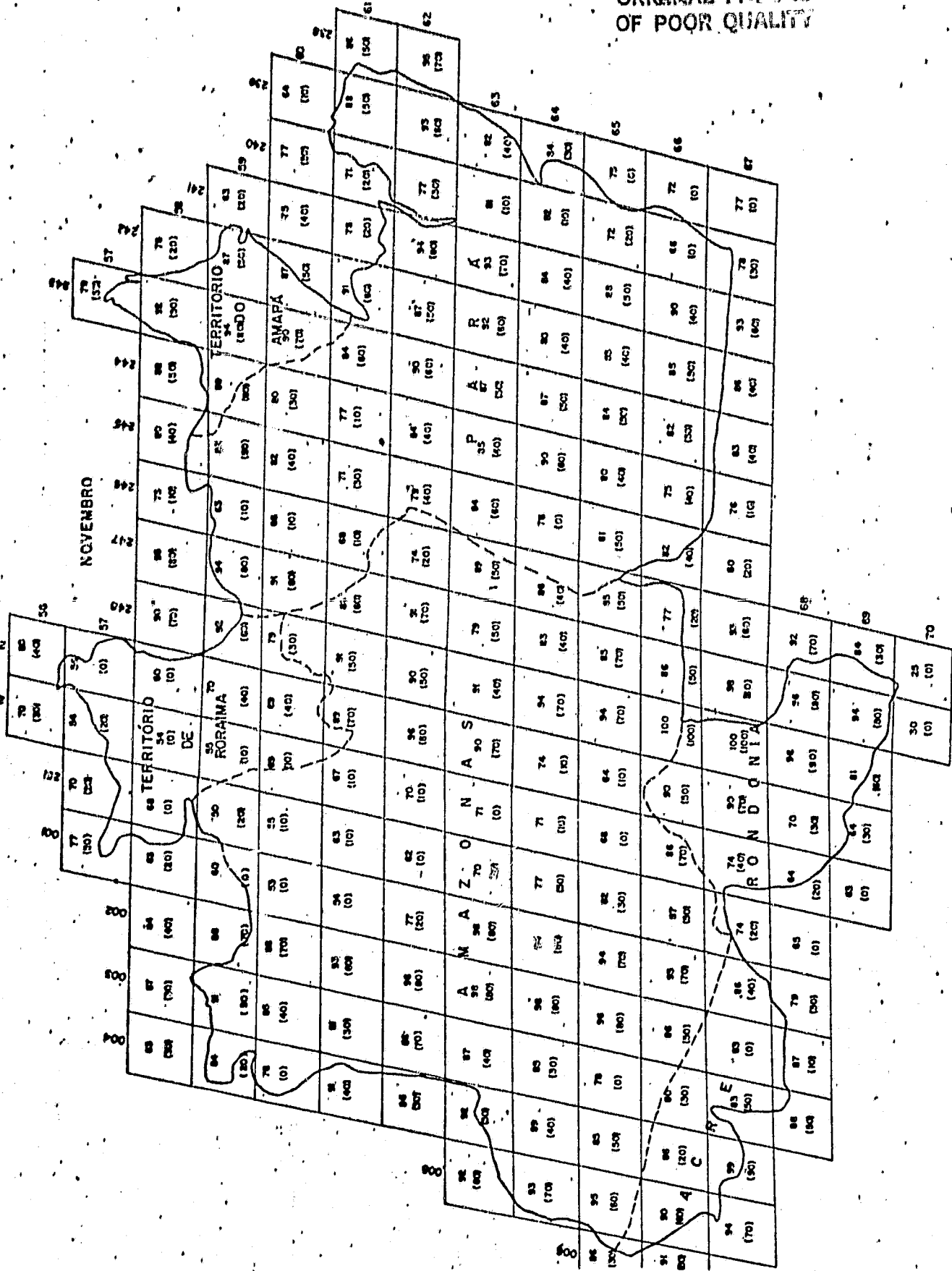
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|----|----|----|----|----|----|----|----|----|----|----|
| 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 |
| 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 |
| 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 |
| 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 |
| 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 |
| 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 |
| 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 |
| 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 |
| 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 |
| 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 |
| 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 |
| 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 |
| 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 |
| 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 |
| 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 |
| 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 |
| 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |

TERRITÓRIO DE RORAIMA
 TERRITÓRIO DO AMAPÁ
 TERRITÓRIO DE PARÁ
 TERRITÓRIO DE MATO GROSSO DO SUL
 TERRITÓRIO DE MATO GROSSO DO NORTE
 TERRITÓRIO DE RONDÔNIA

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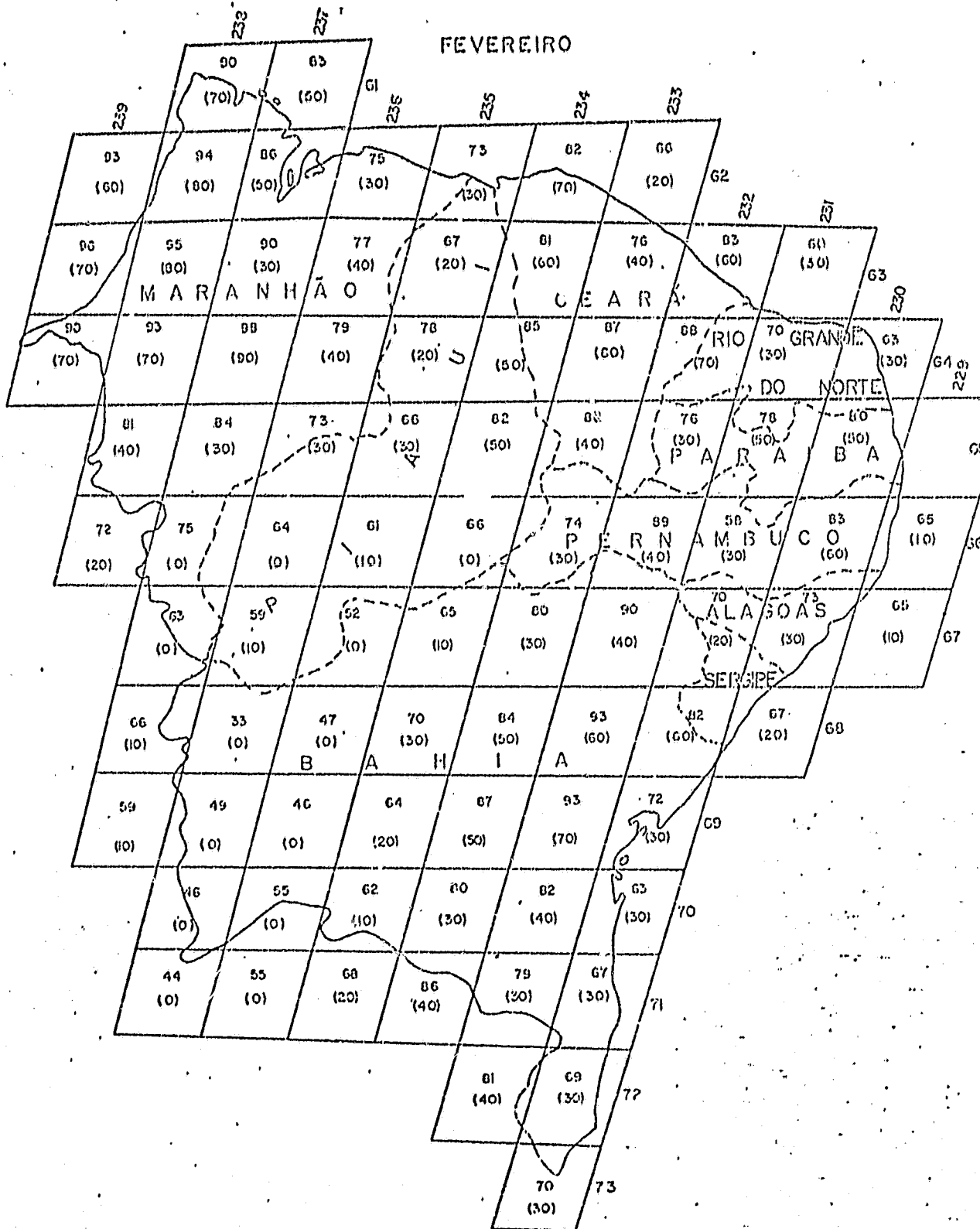


REGIÃO NORDESTE

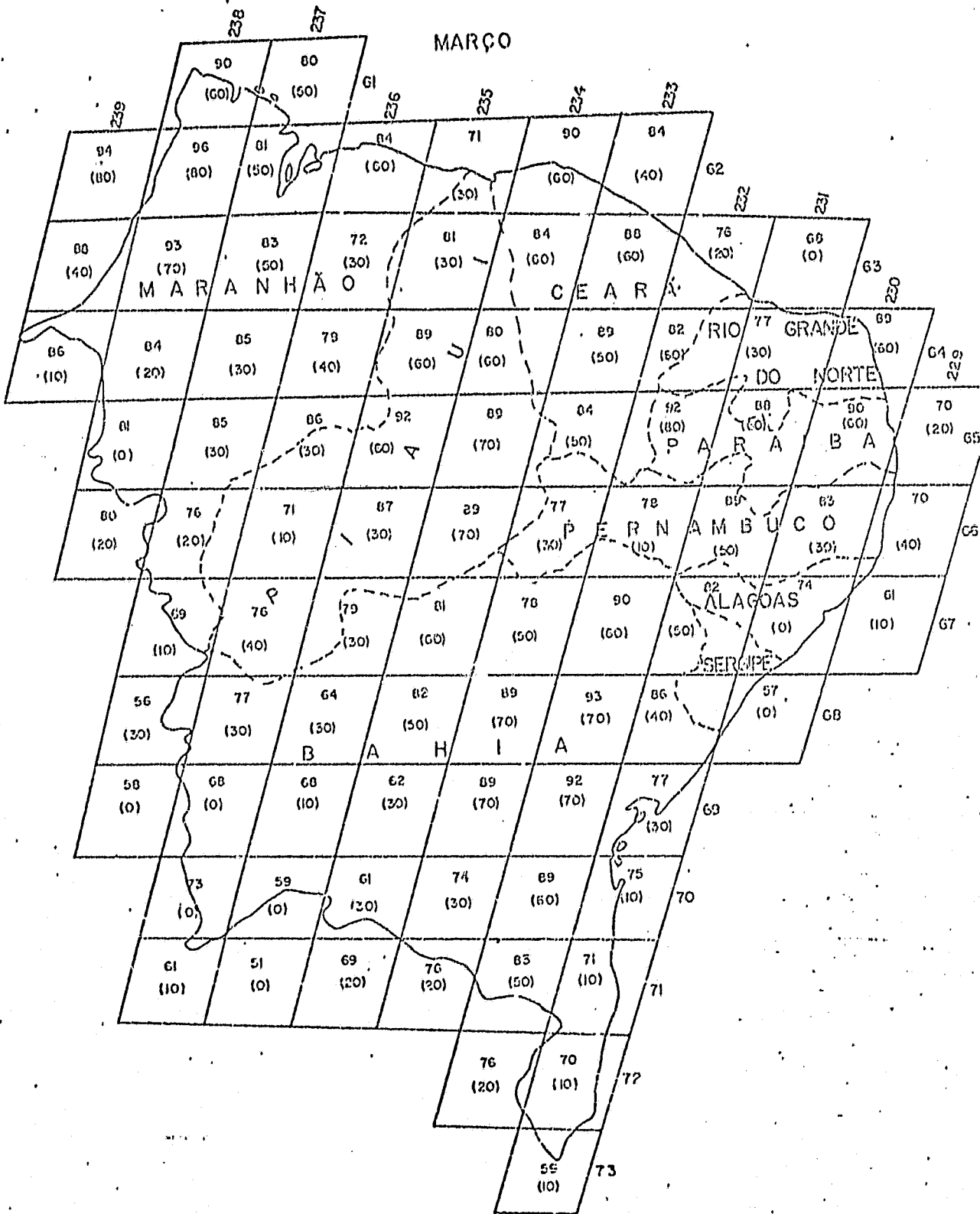
LEGENDA

- A - Valor da média das percentagens de cobertura de nuvens no período de 1973 a 1981.
- (A) - Valor da percentagem mínima de cobertura de nuvens ocorrida no período de 1973 a 1981.

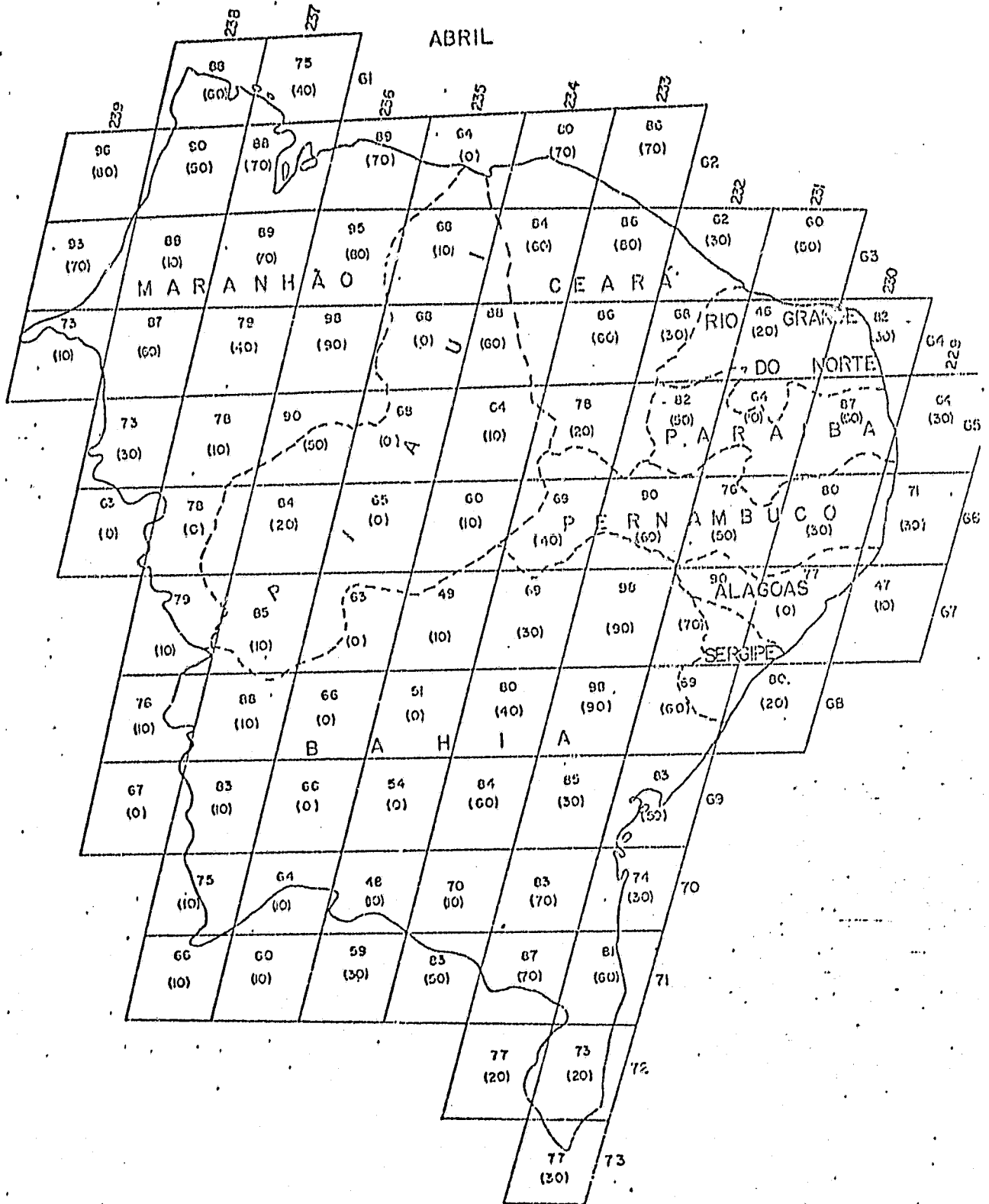
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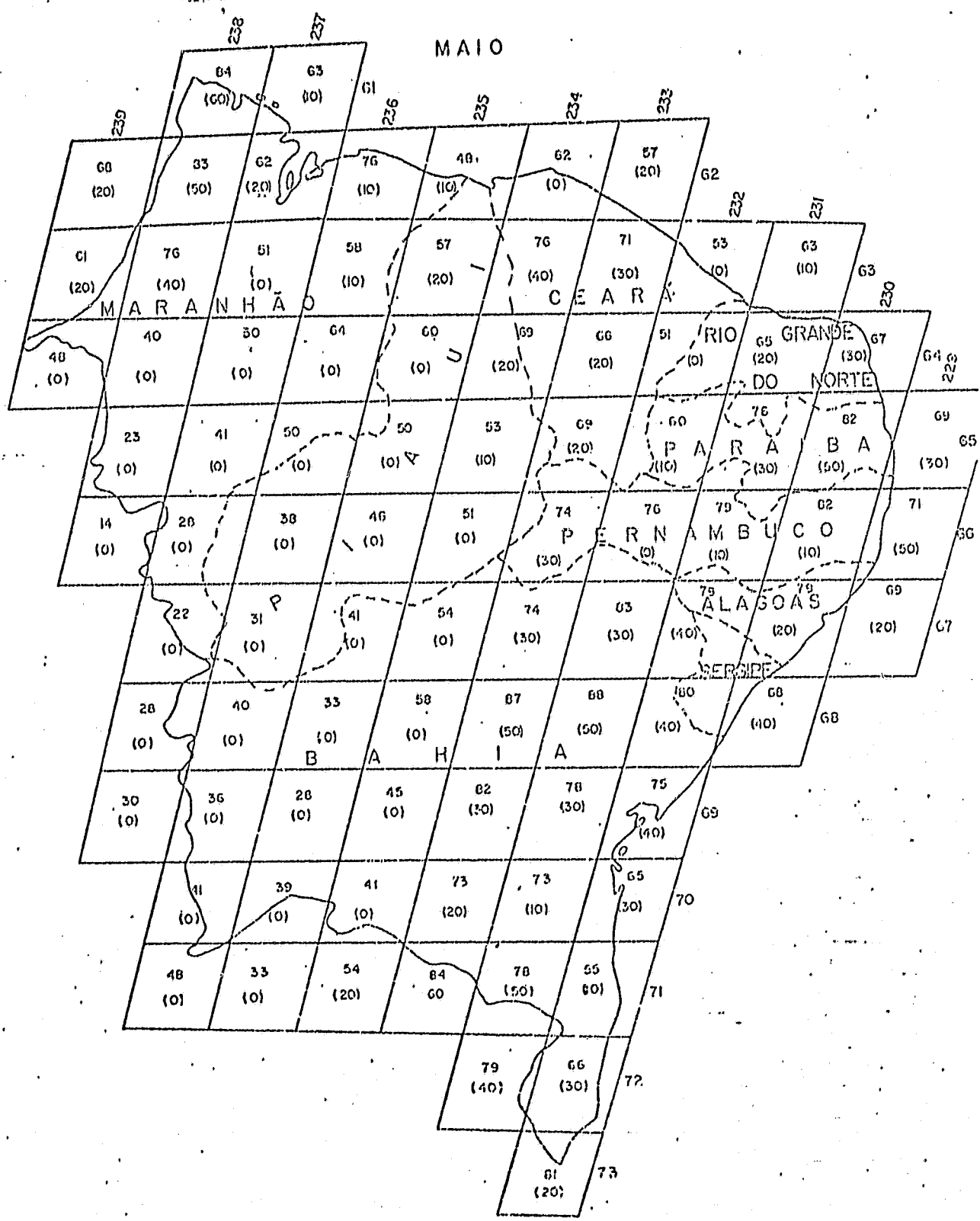
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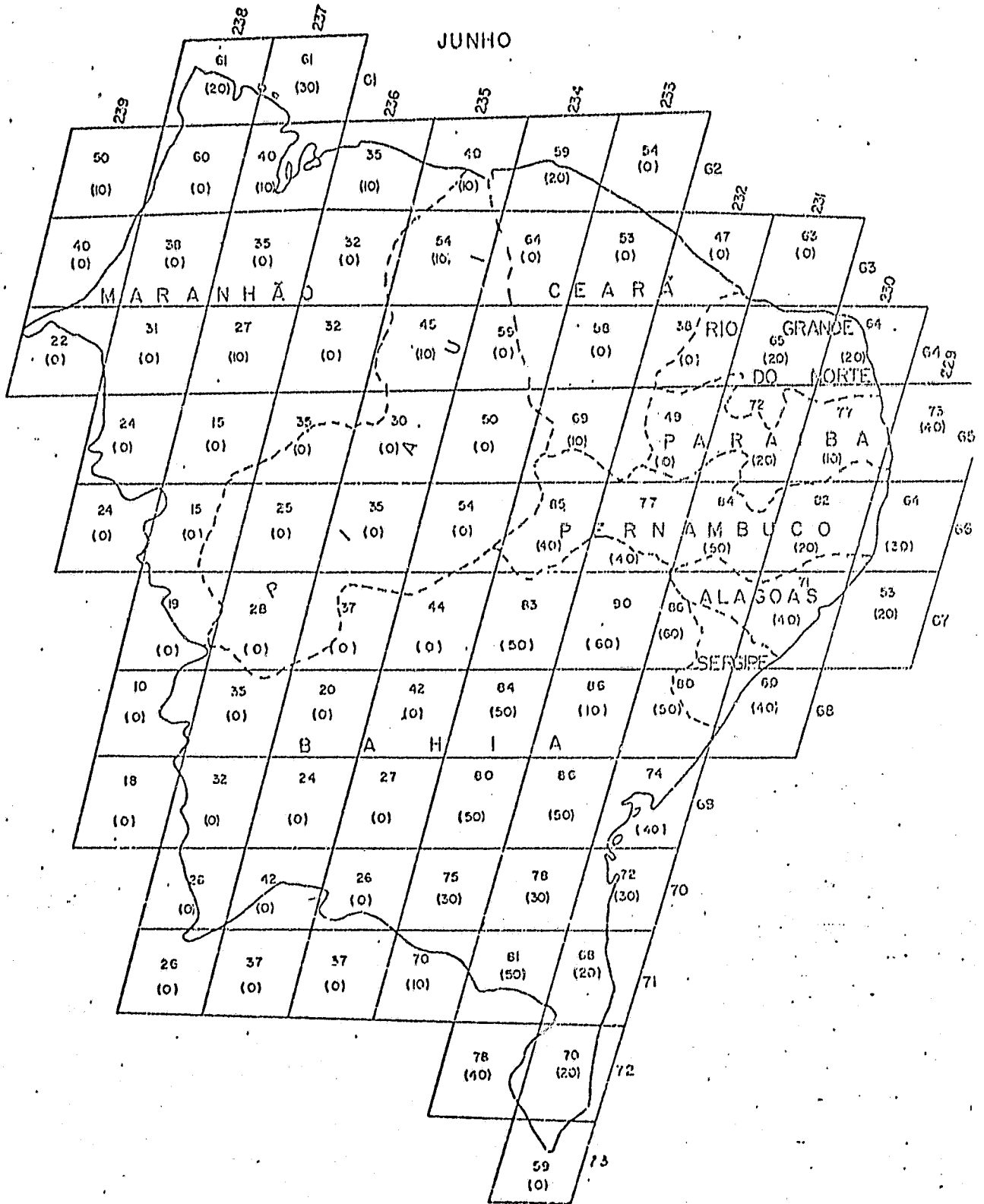
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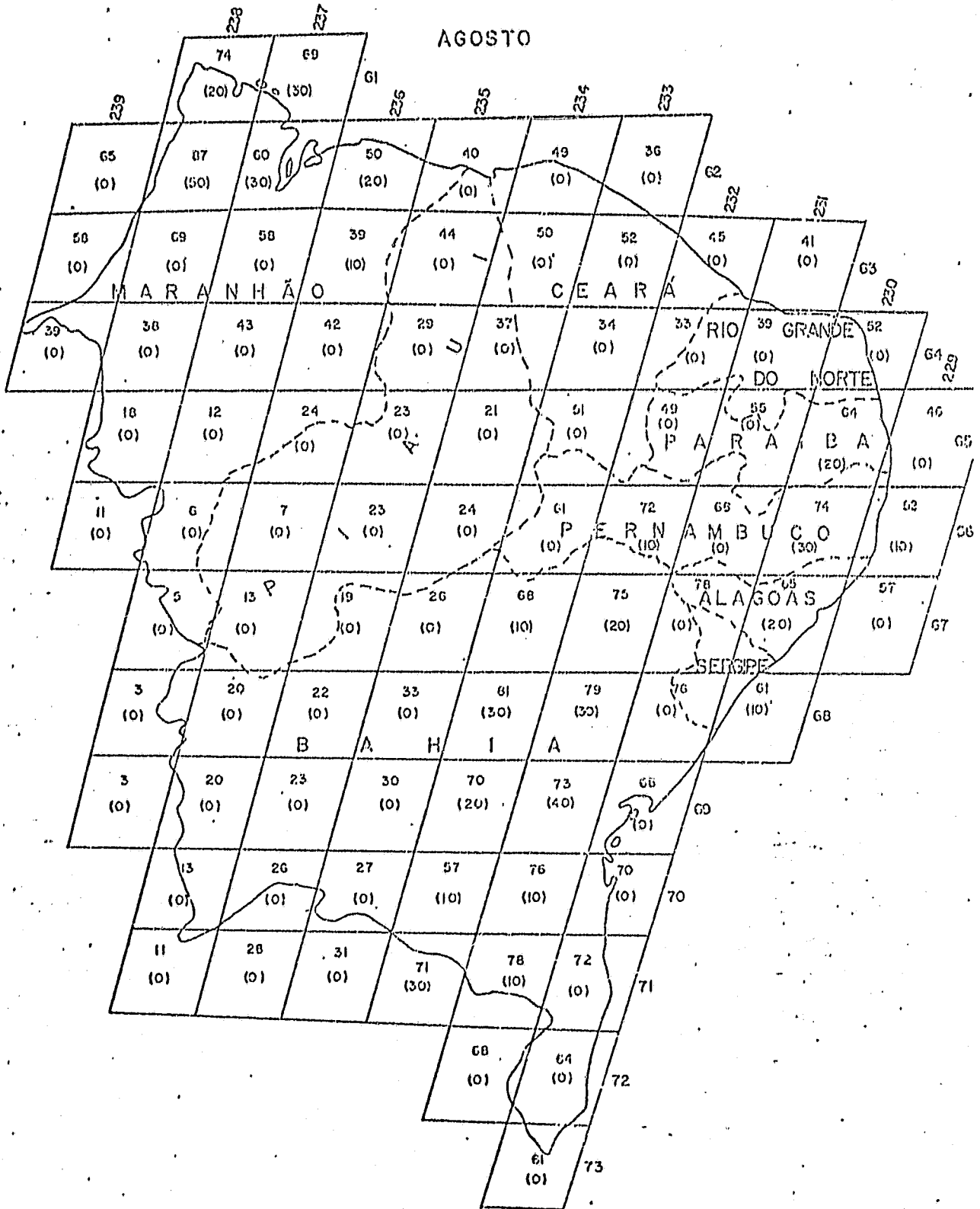
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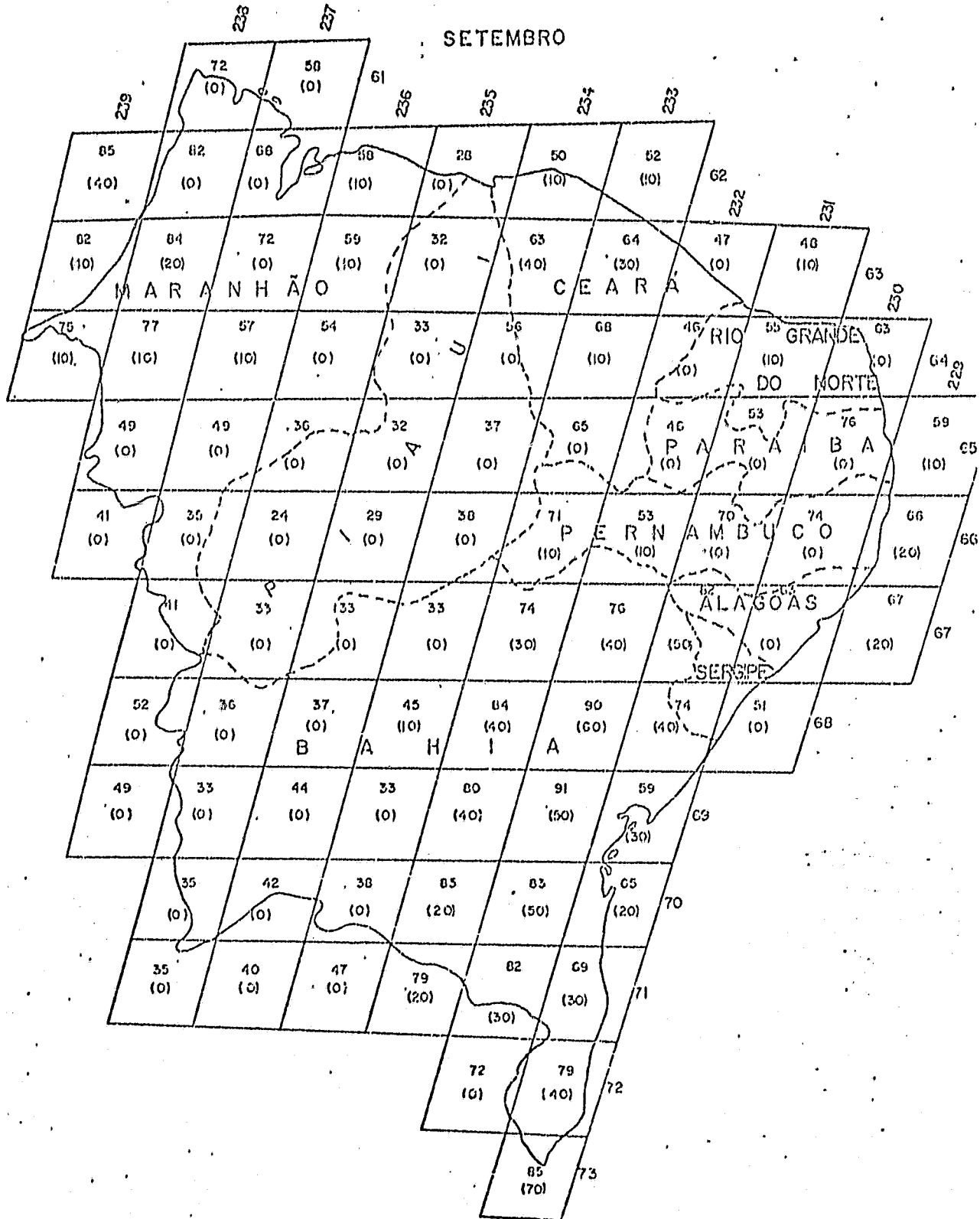
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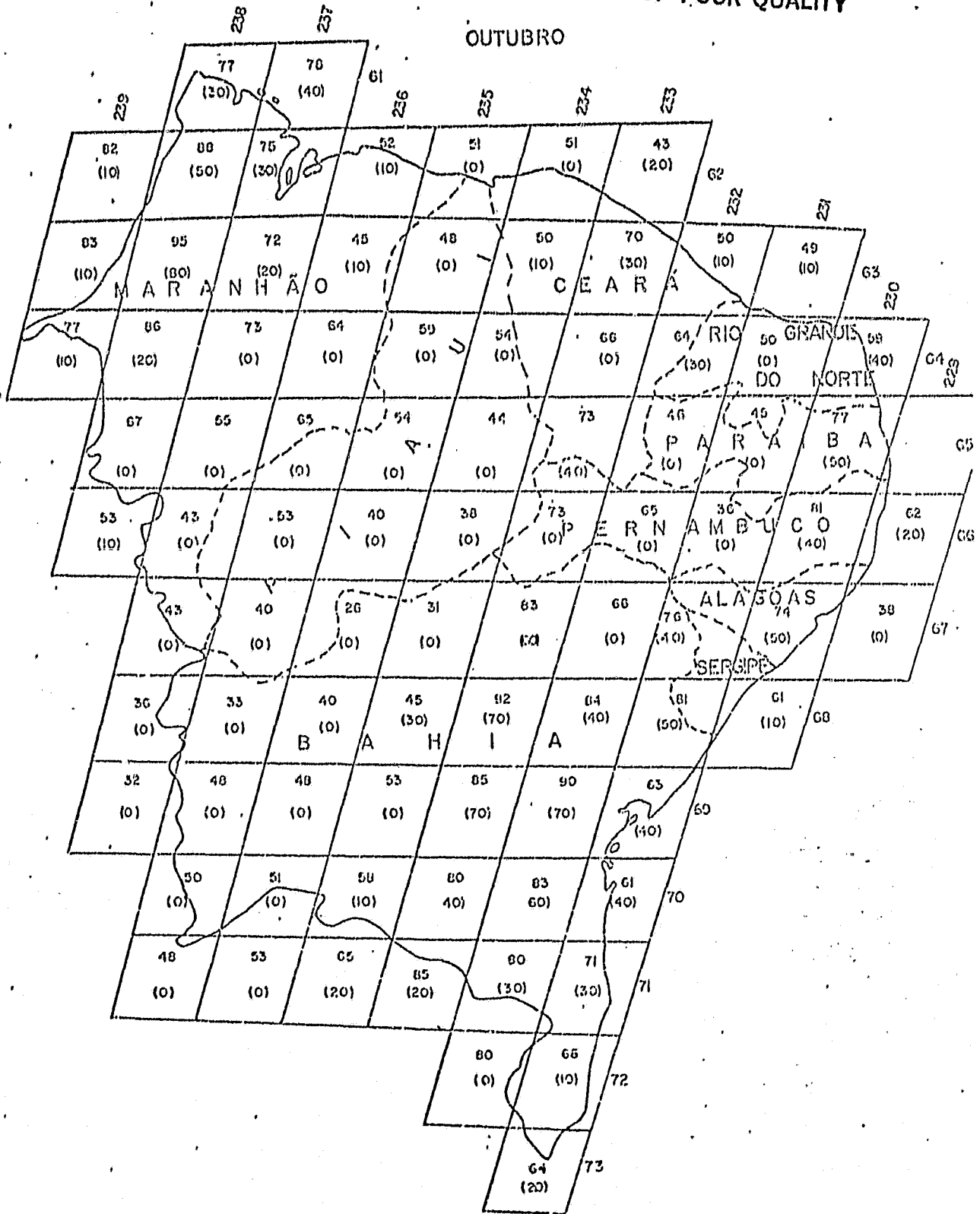
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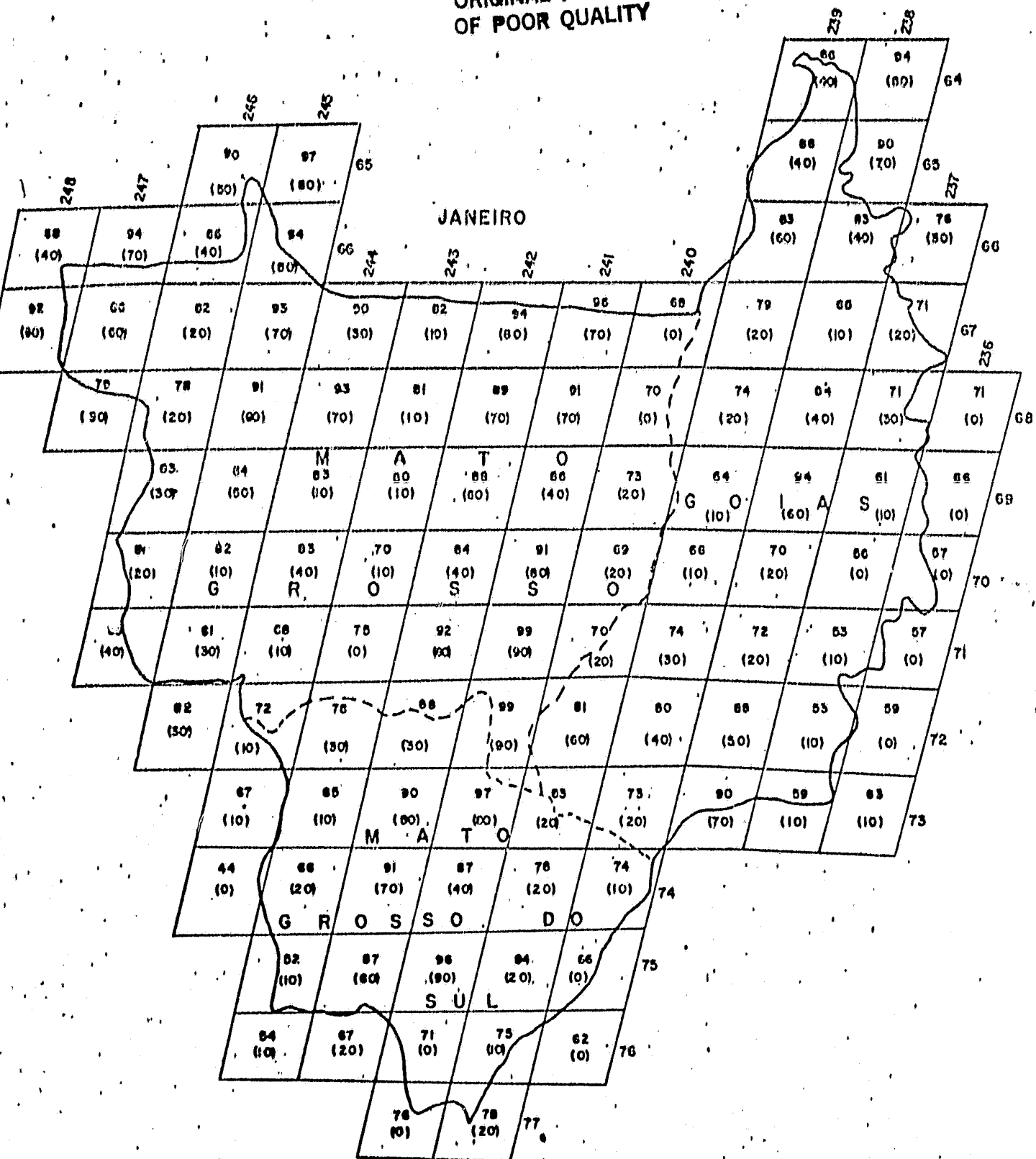
REGIÃO CENTRO OESTE

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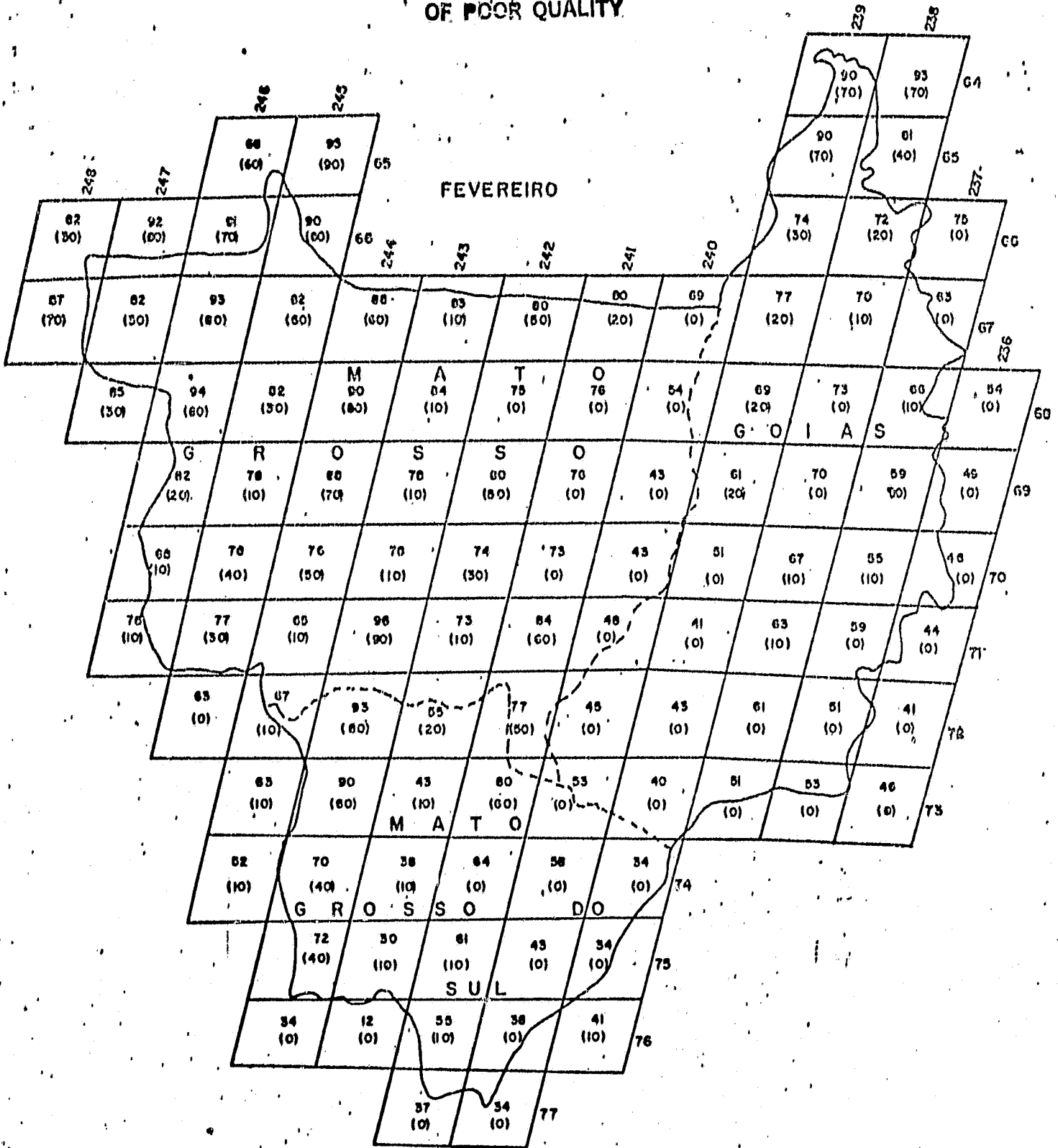
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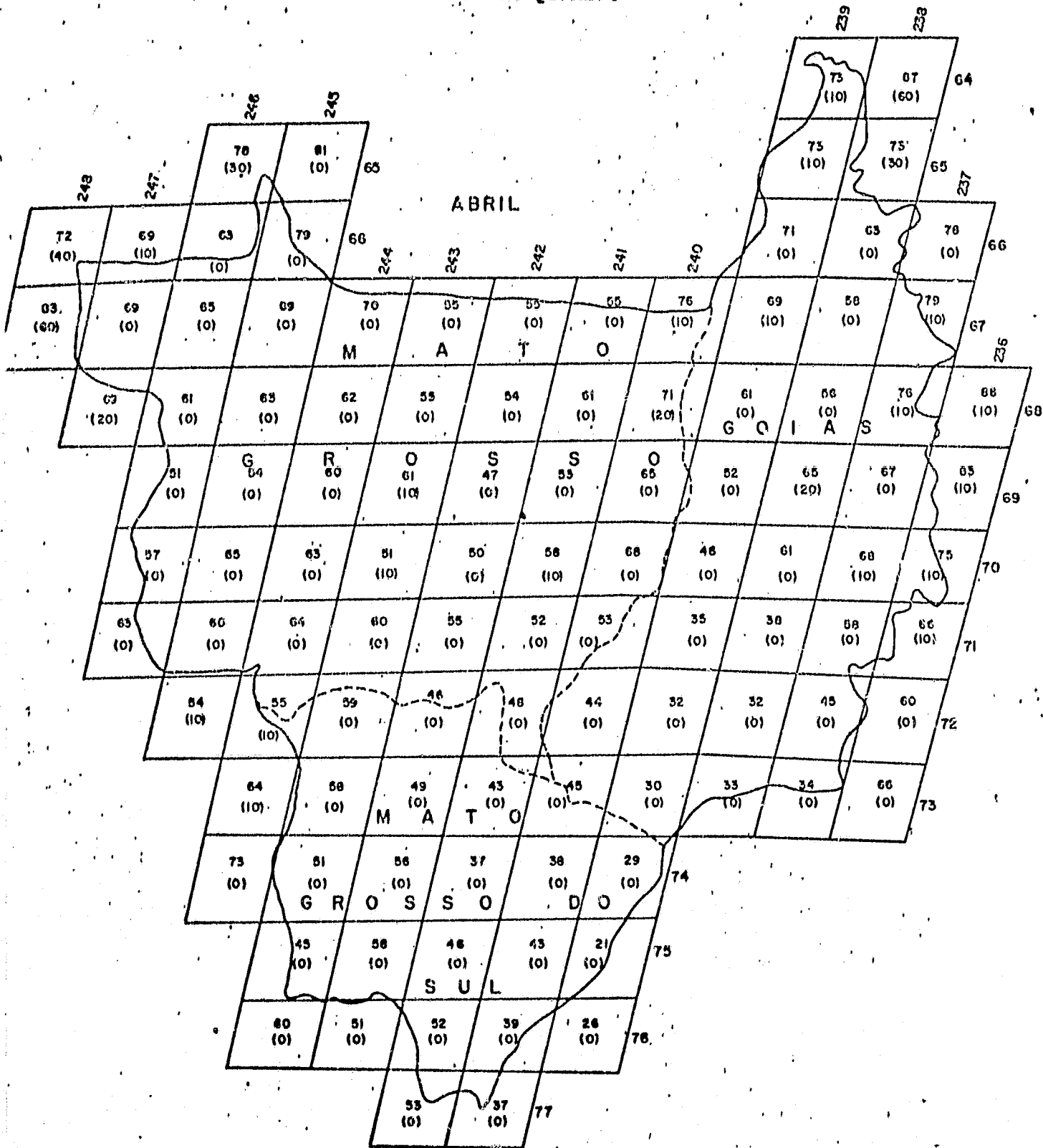
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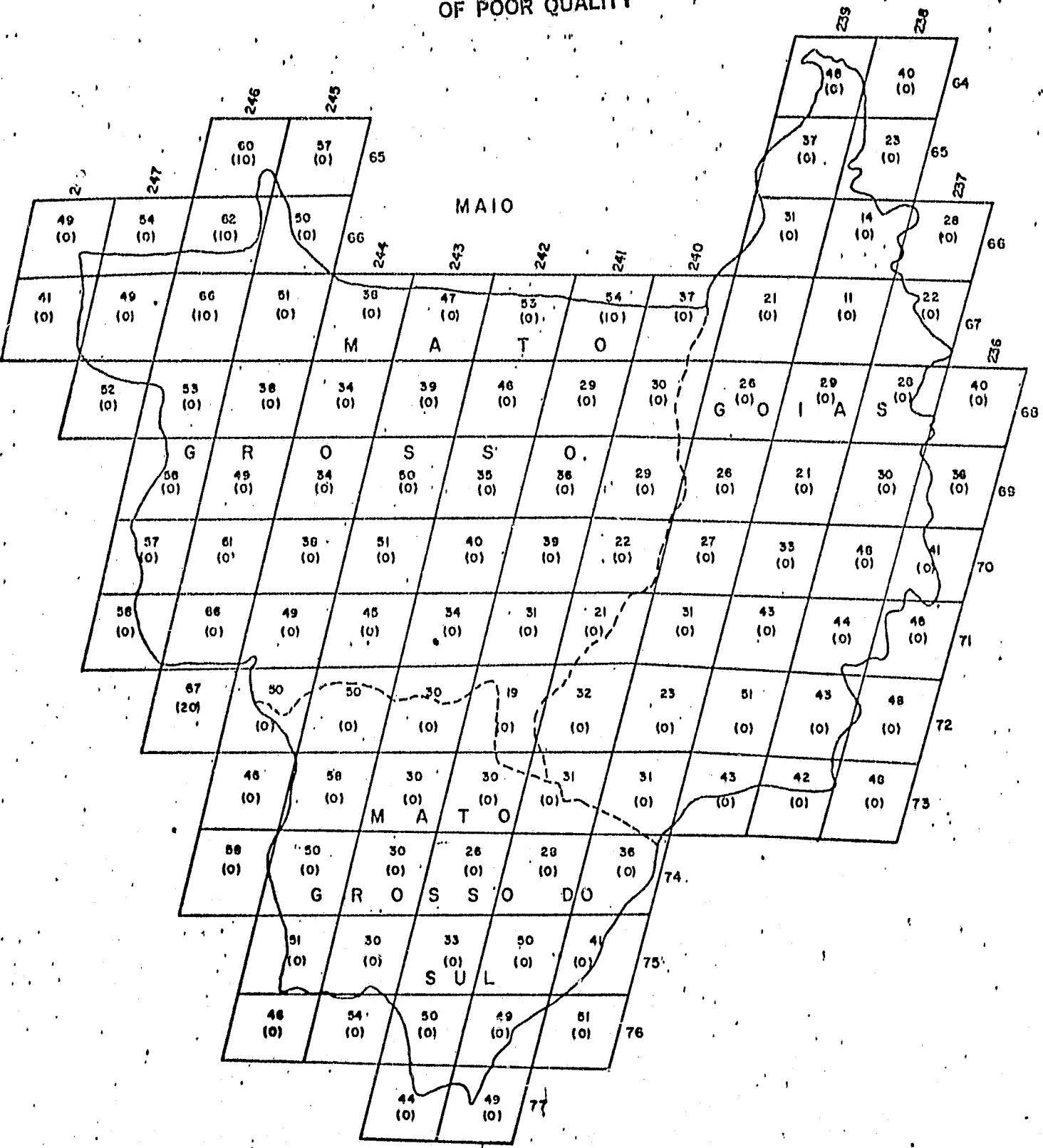
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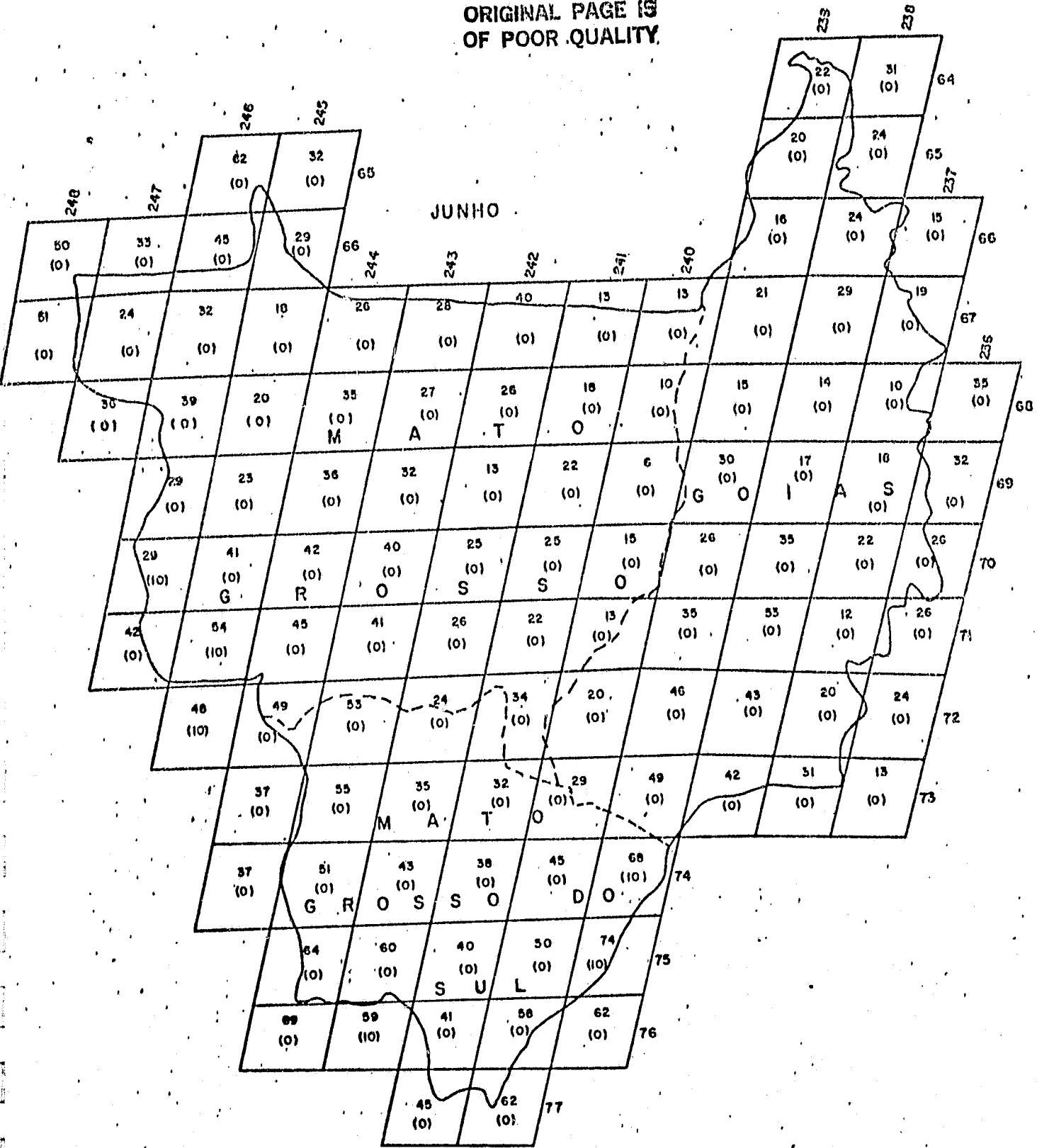
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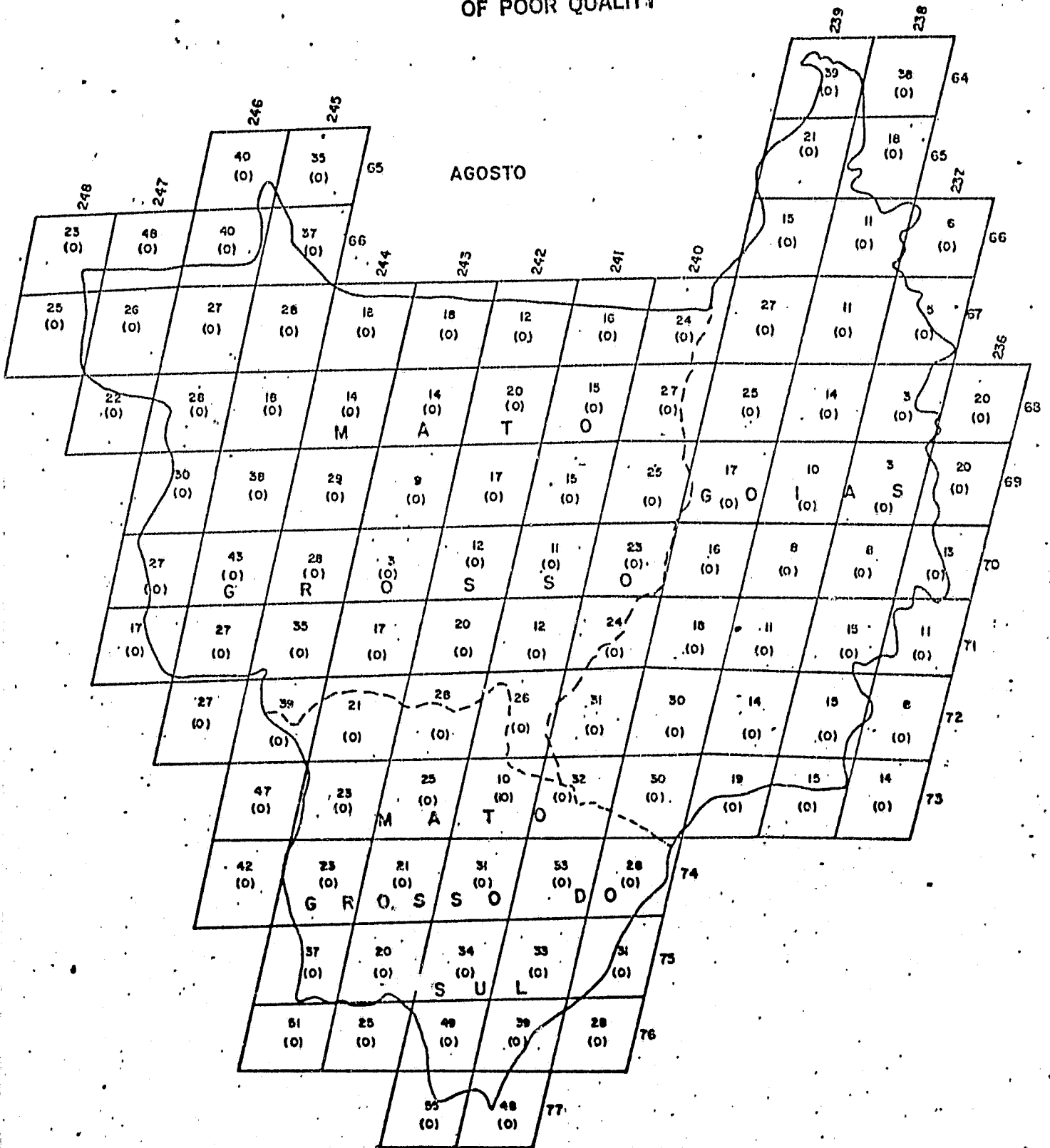
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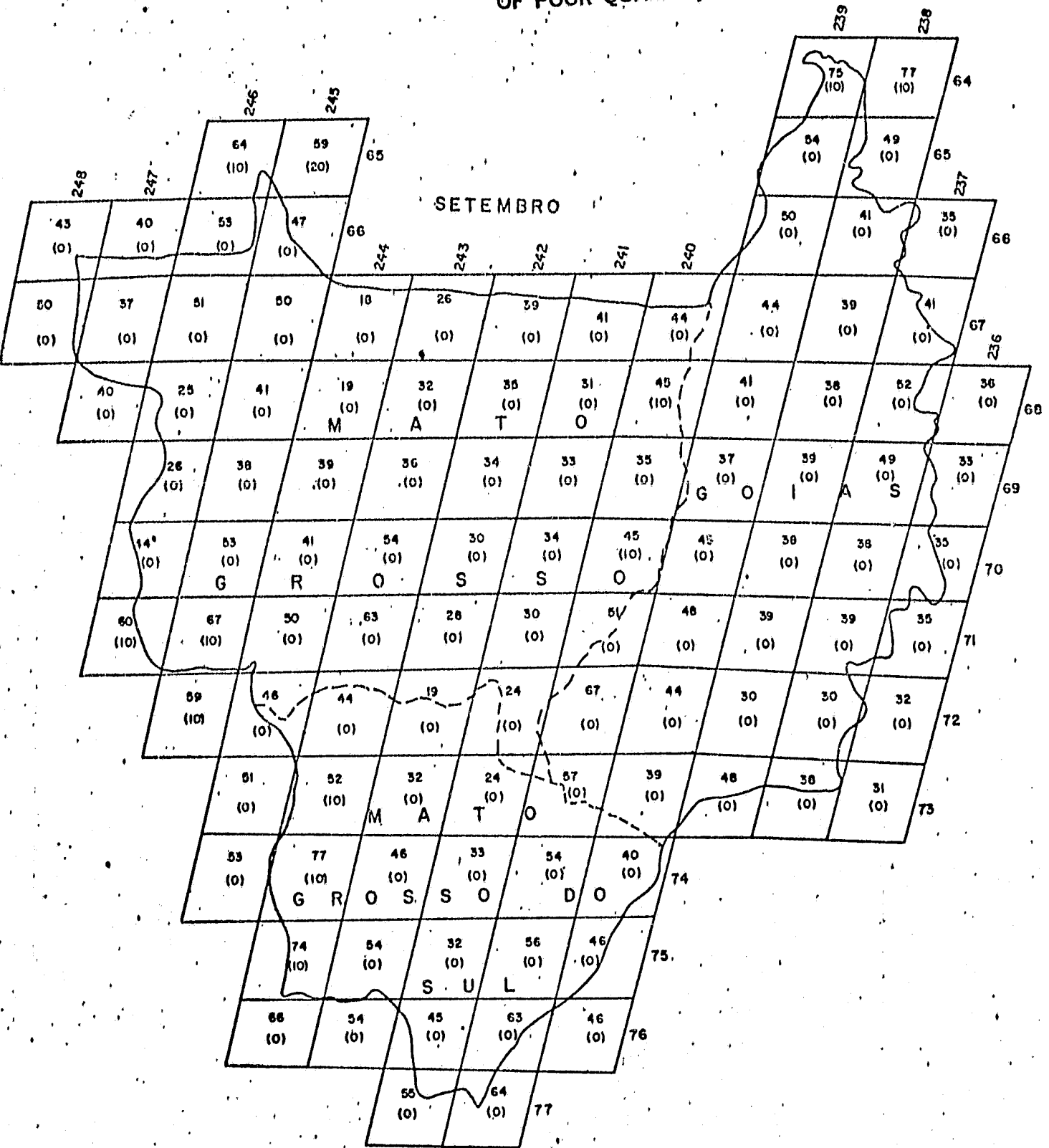
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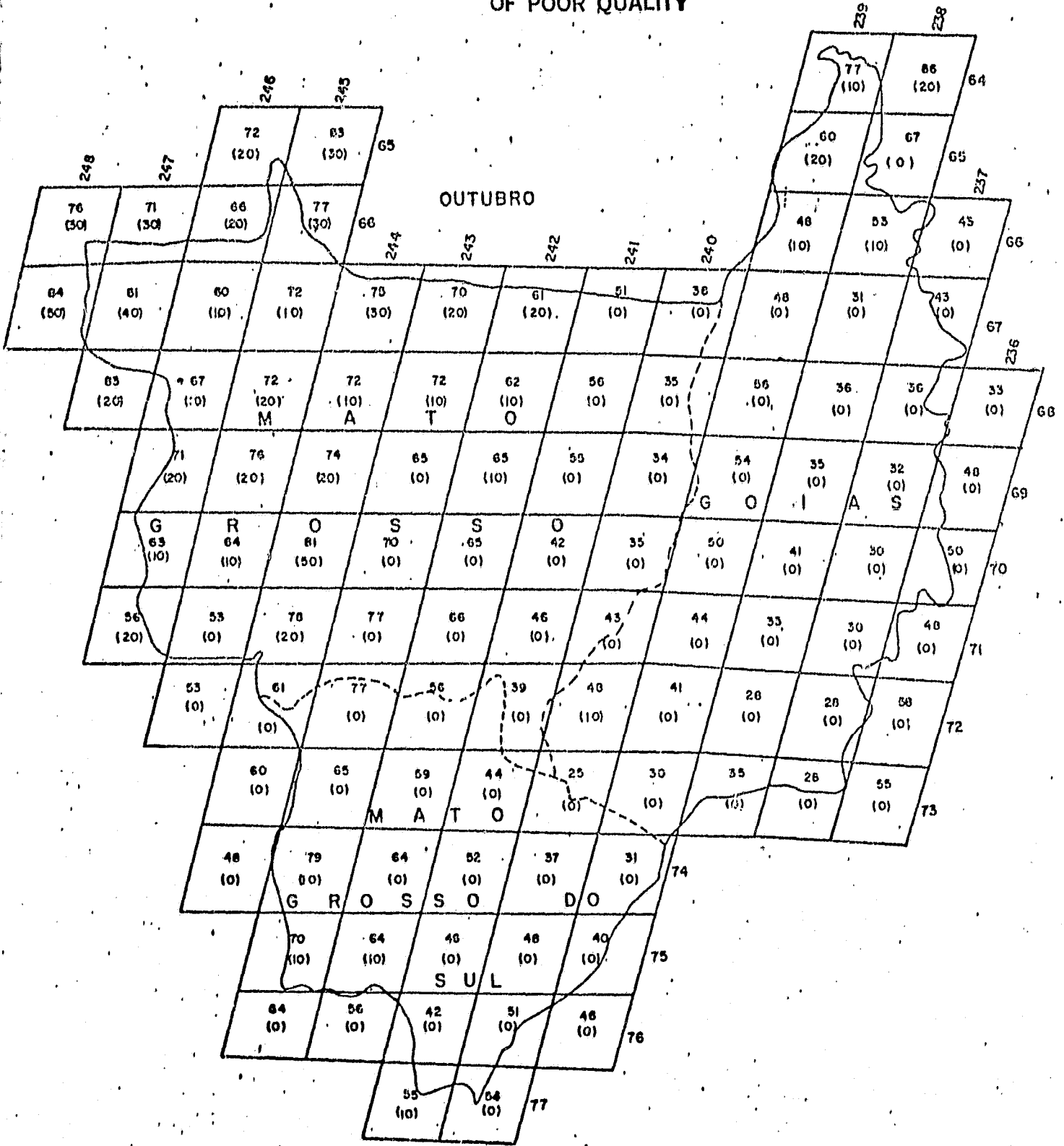
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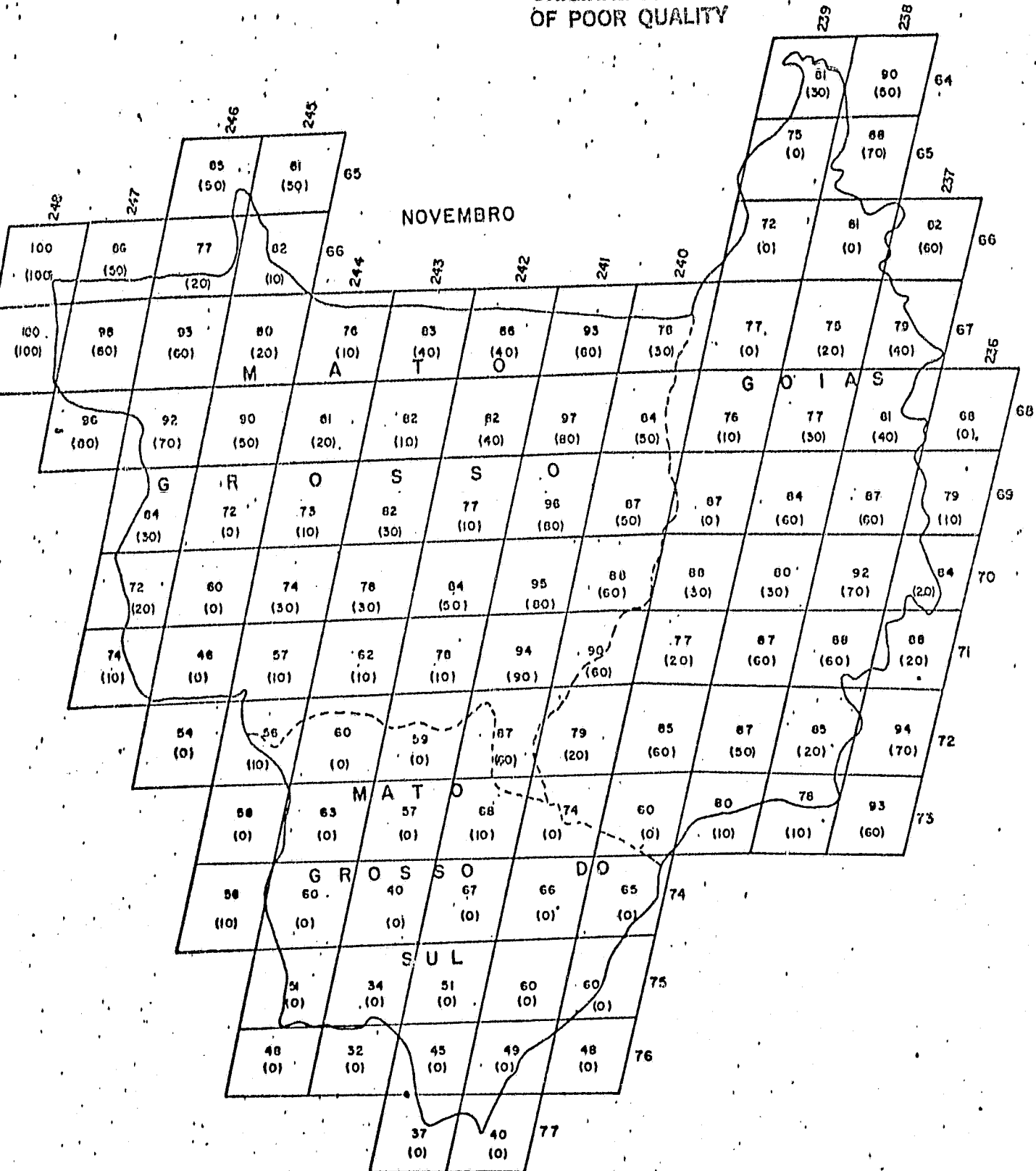
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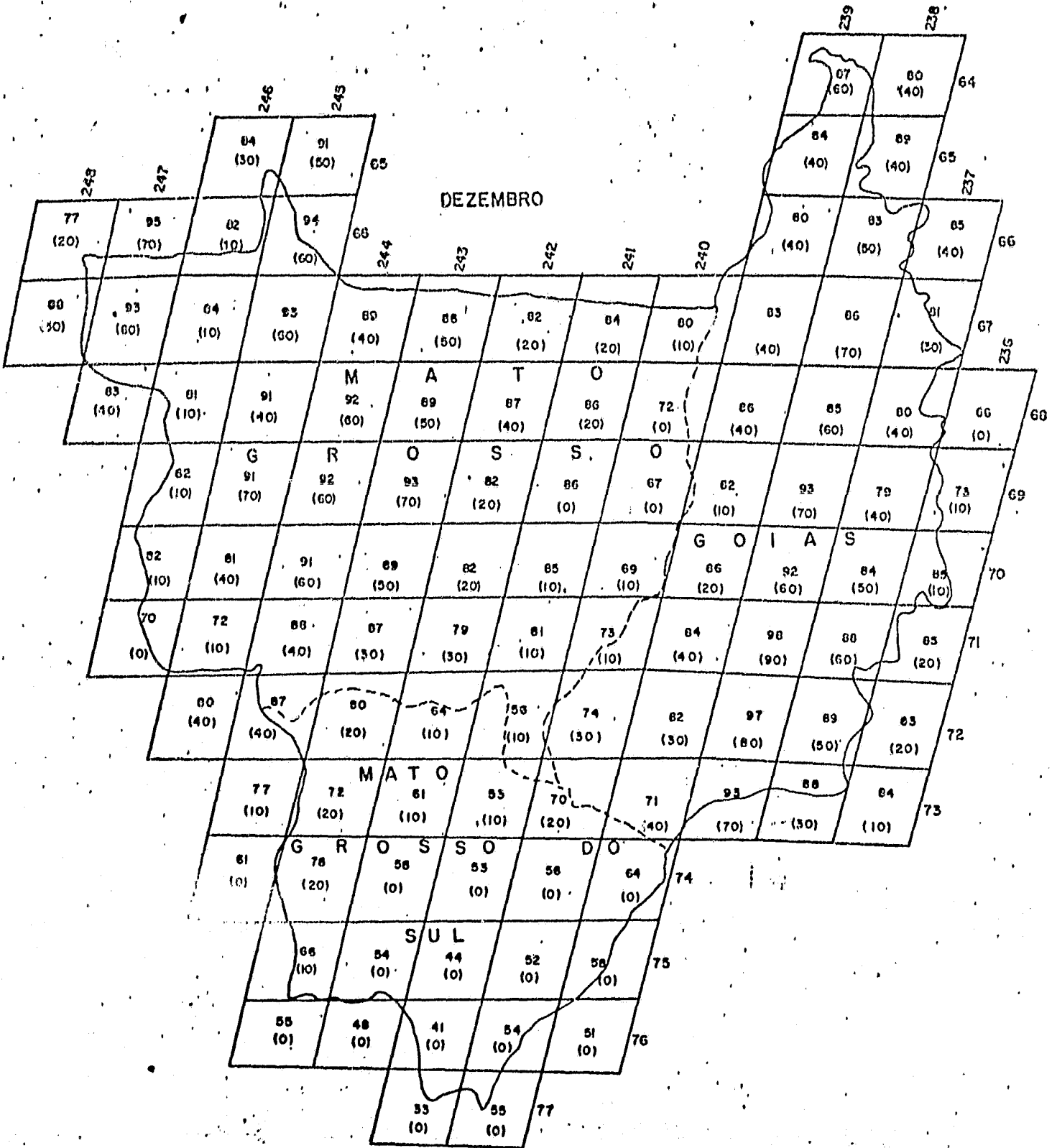
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REGIÃO SUDESTE

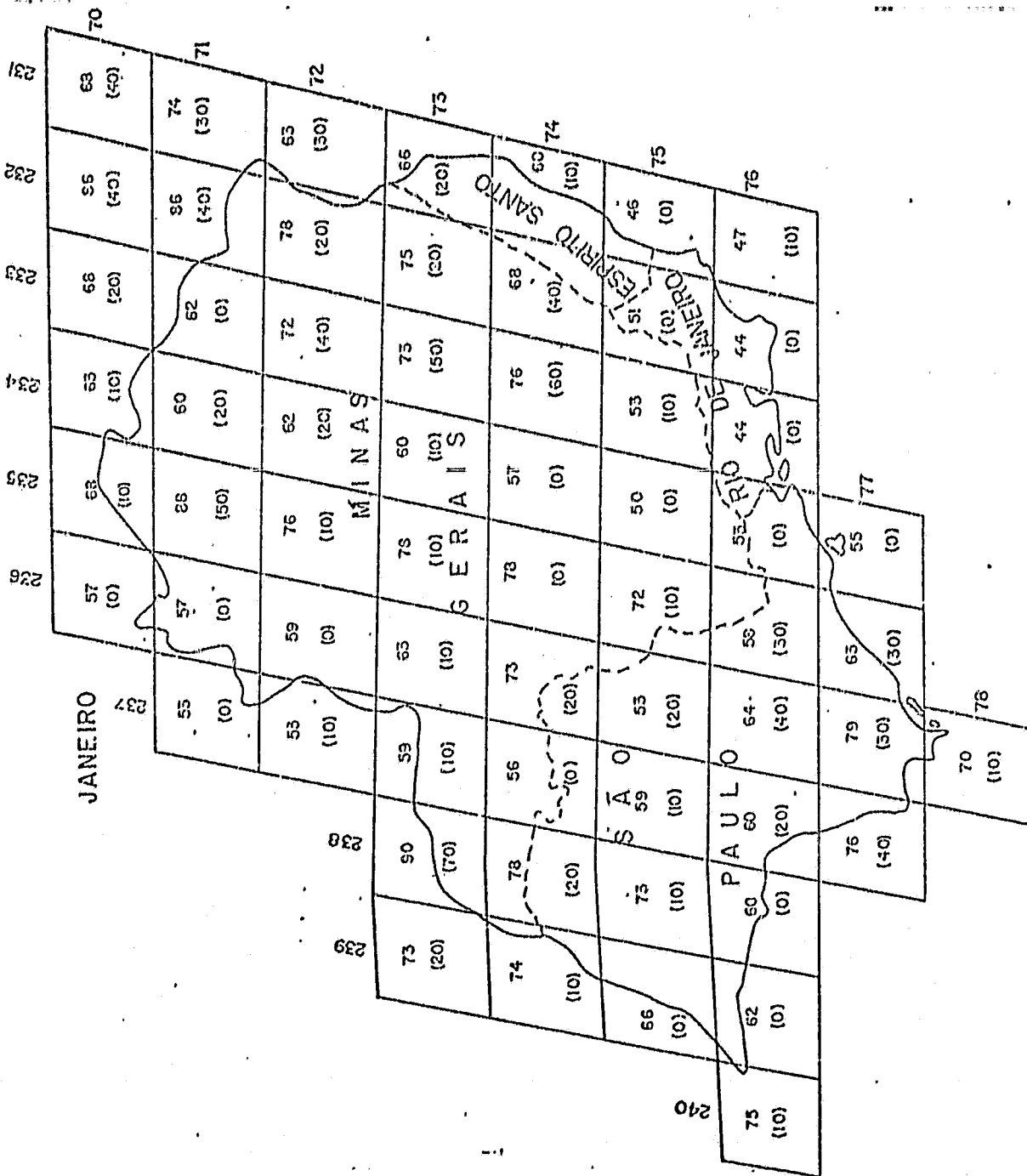
LEGENDA

- A - Valor da média das percentagens de cobertura de nuvens no período de 1973 a 1981.
- (A) - Valor da percentagem mínima de cobertura de nuvens ocorrida no período de 1973 a 1981.

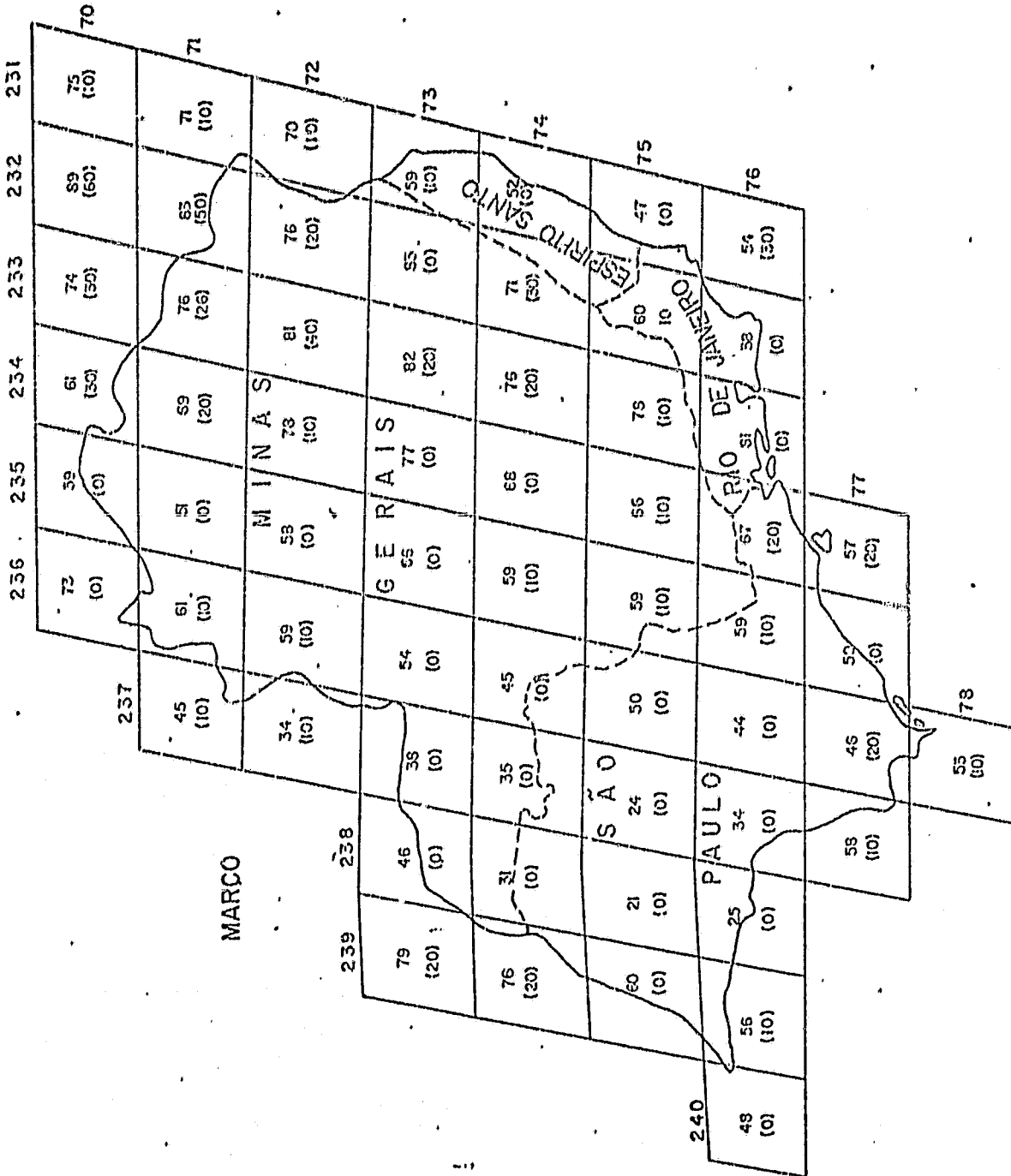
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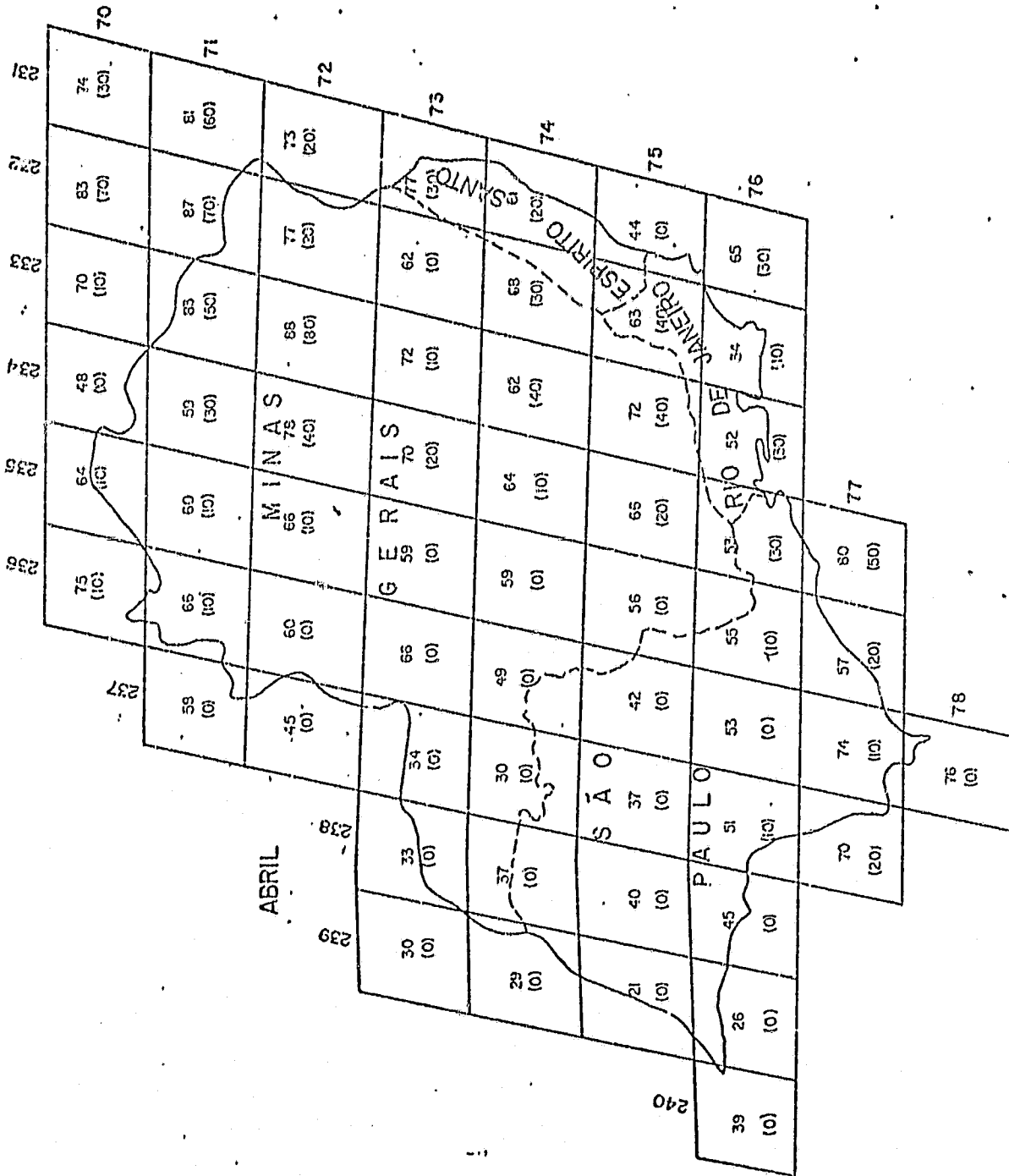
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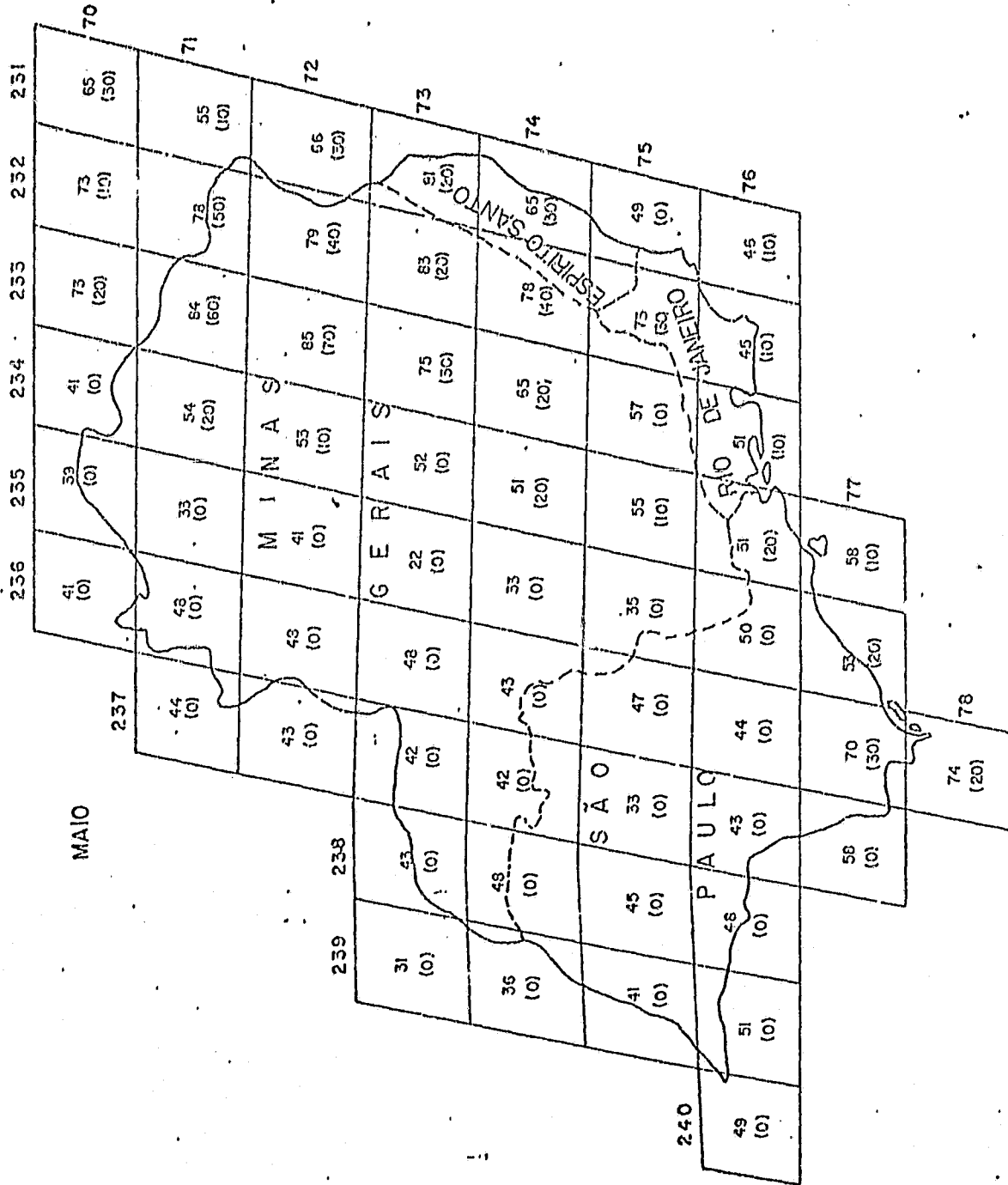
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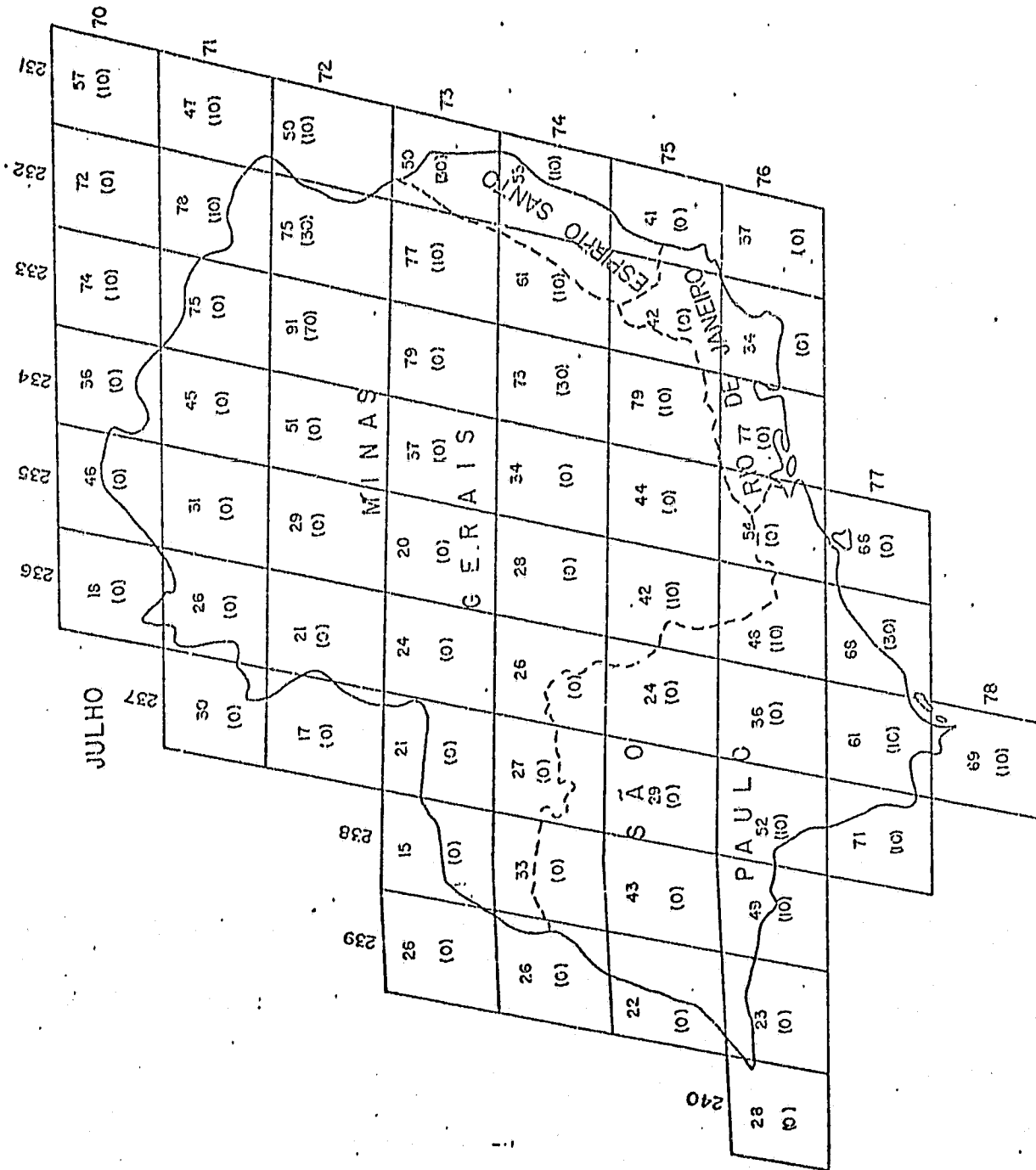
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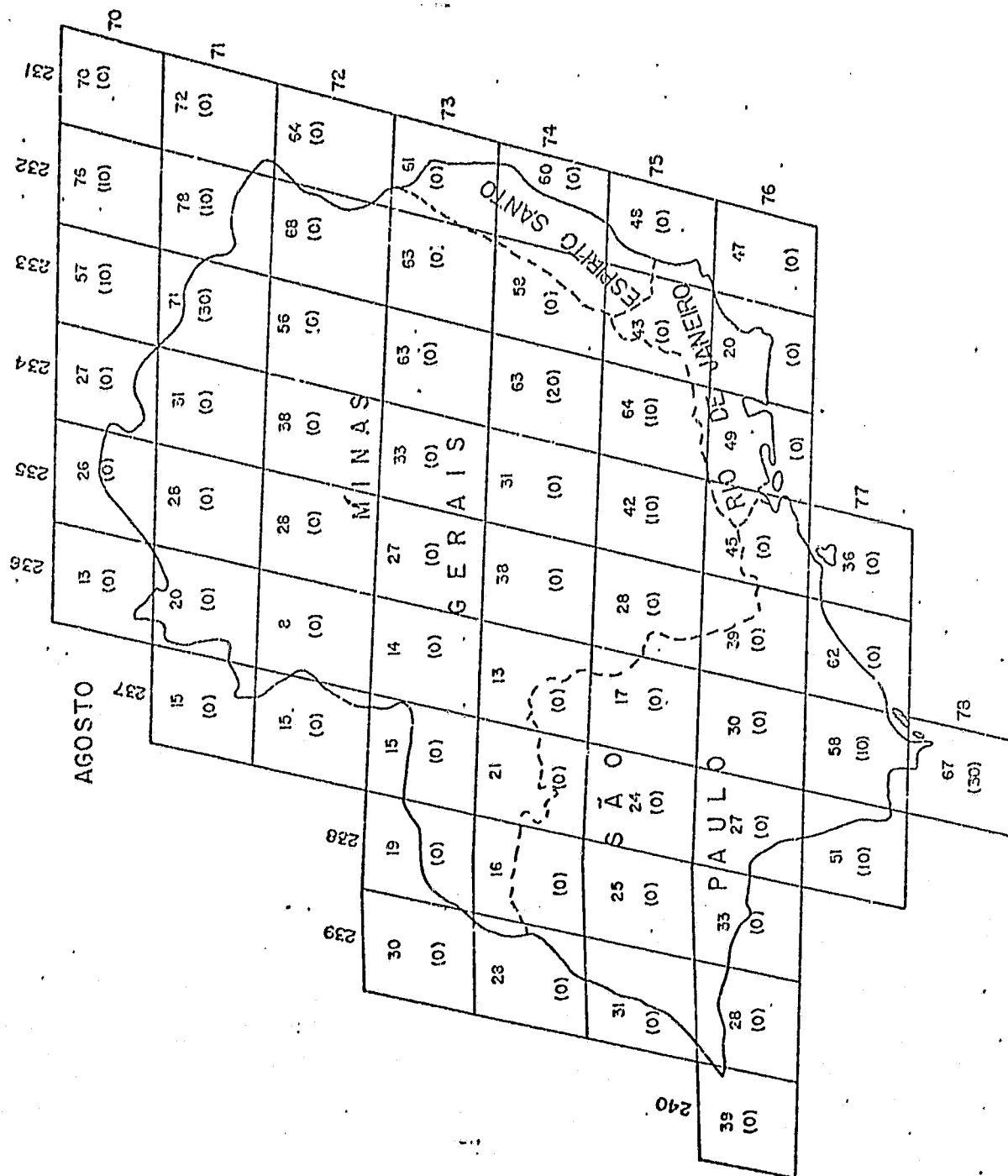
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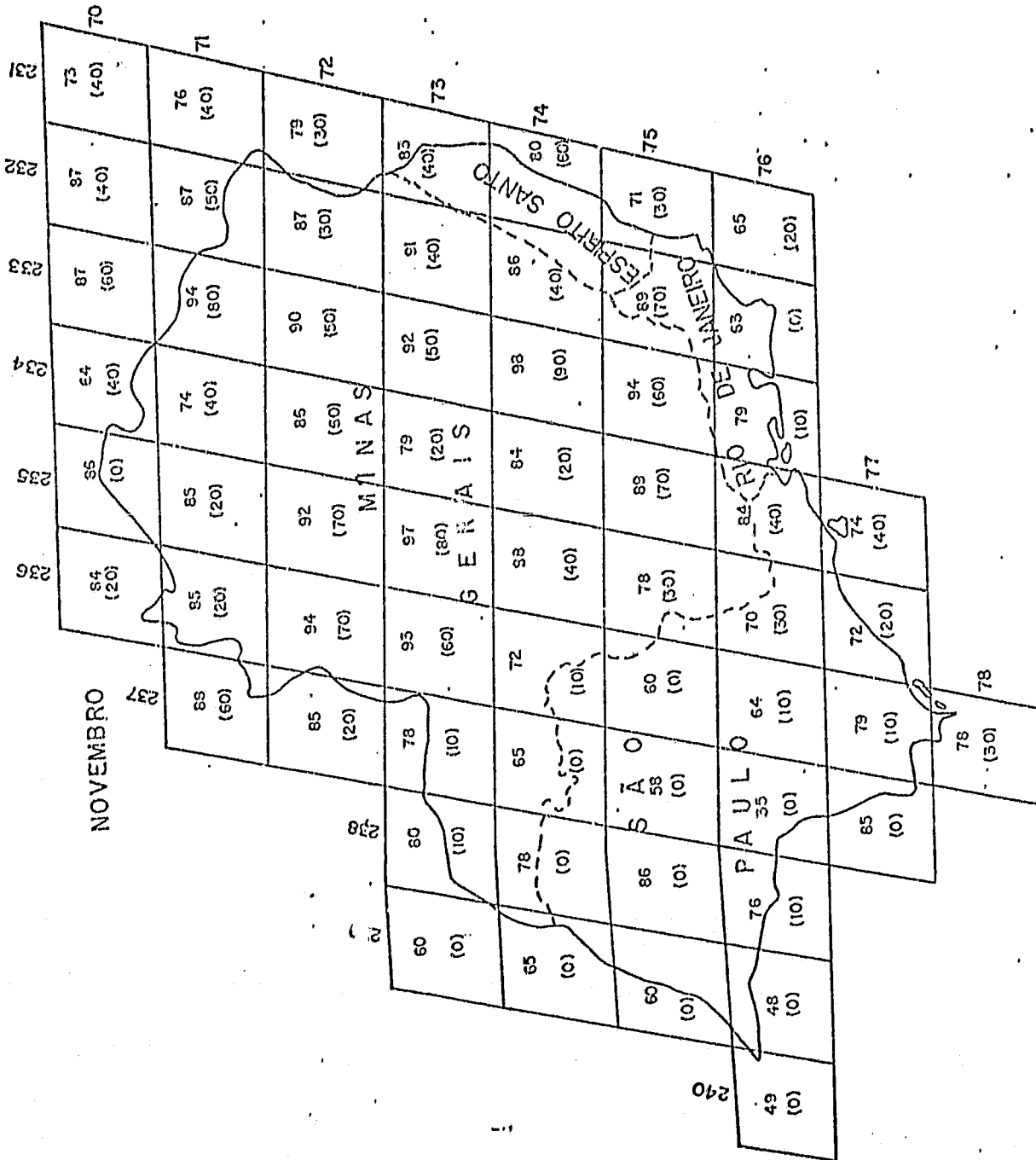
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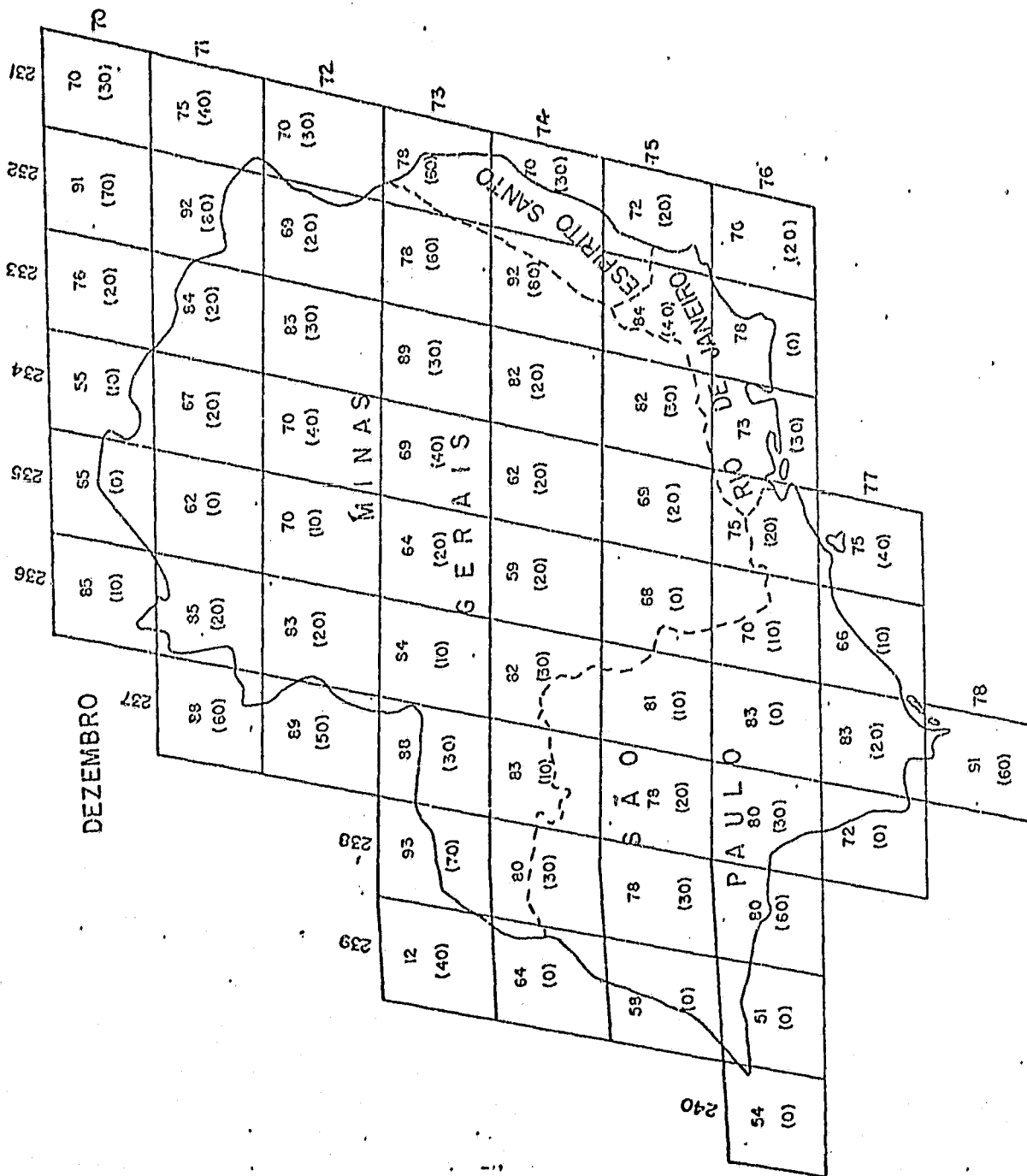
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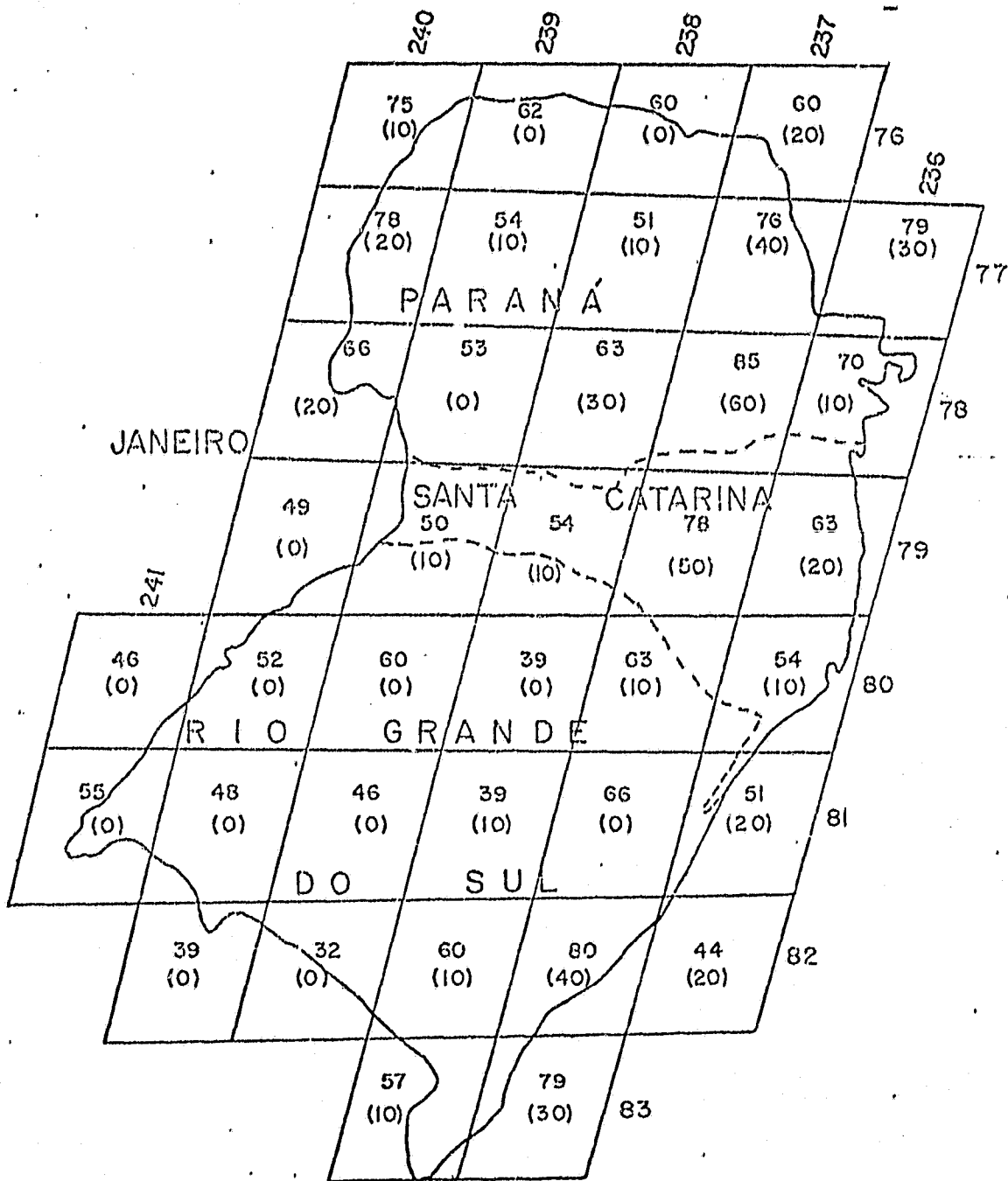
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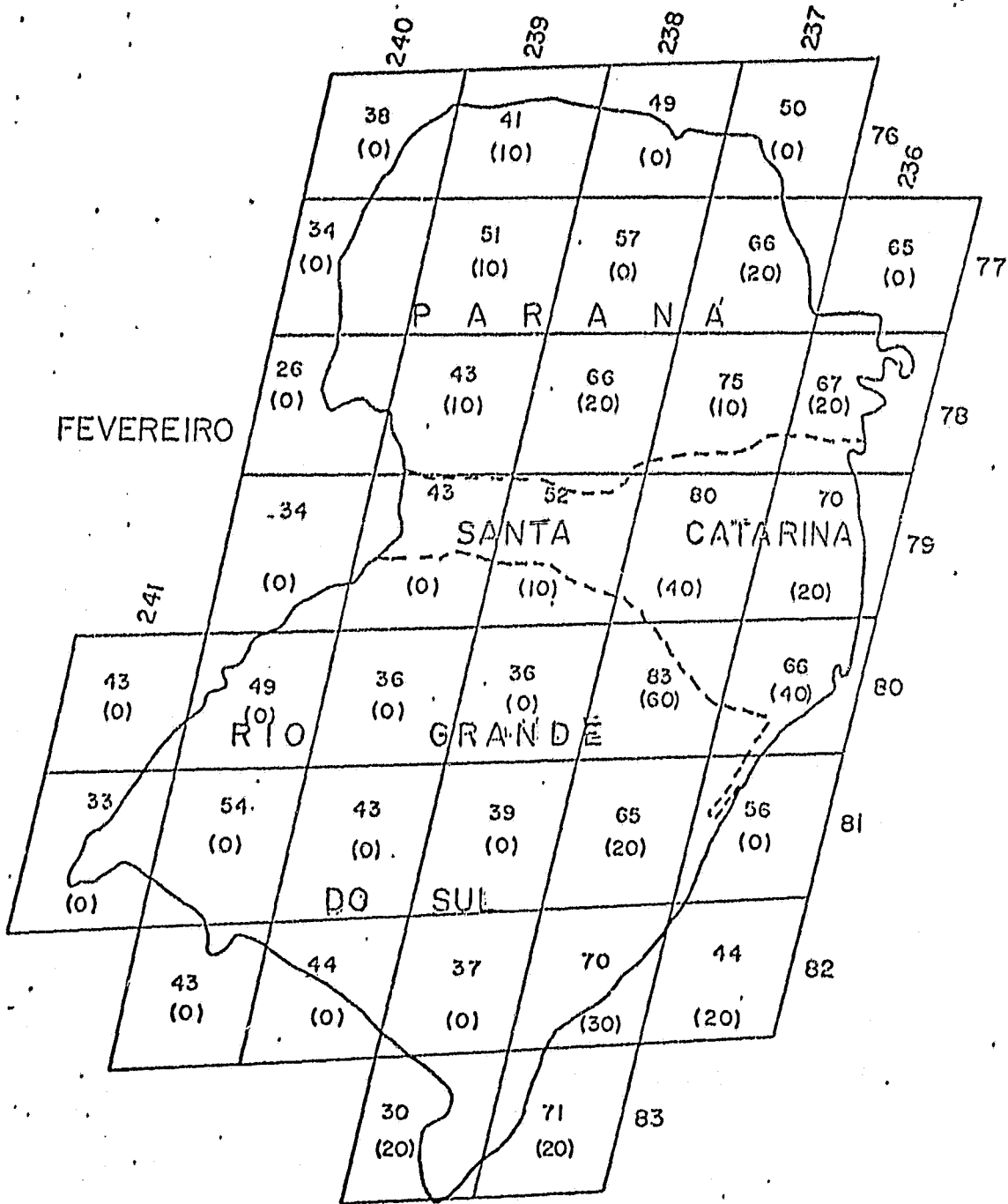
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- (A) - Valor da percentagem mínima de cobertura de nuvens ocorrida no período de 1973 a 1981.

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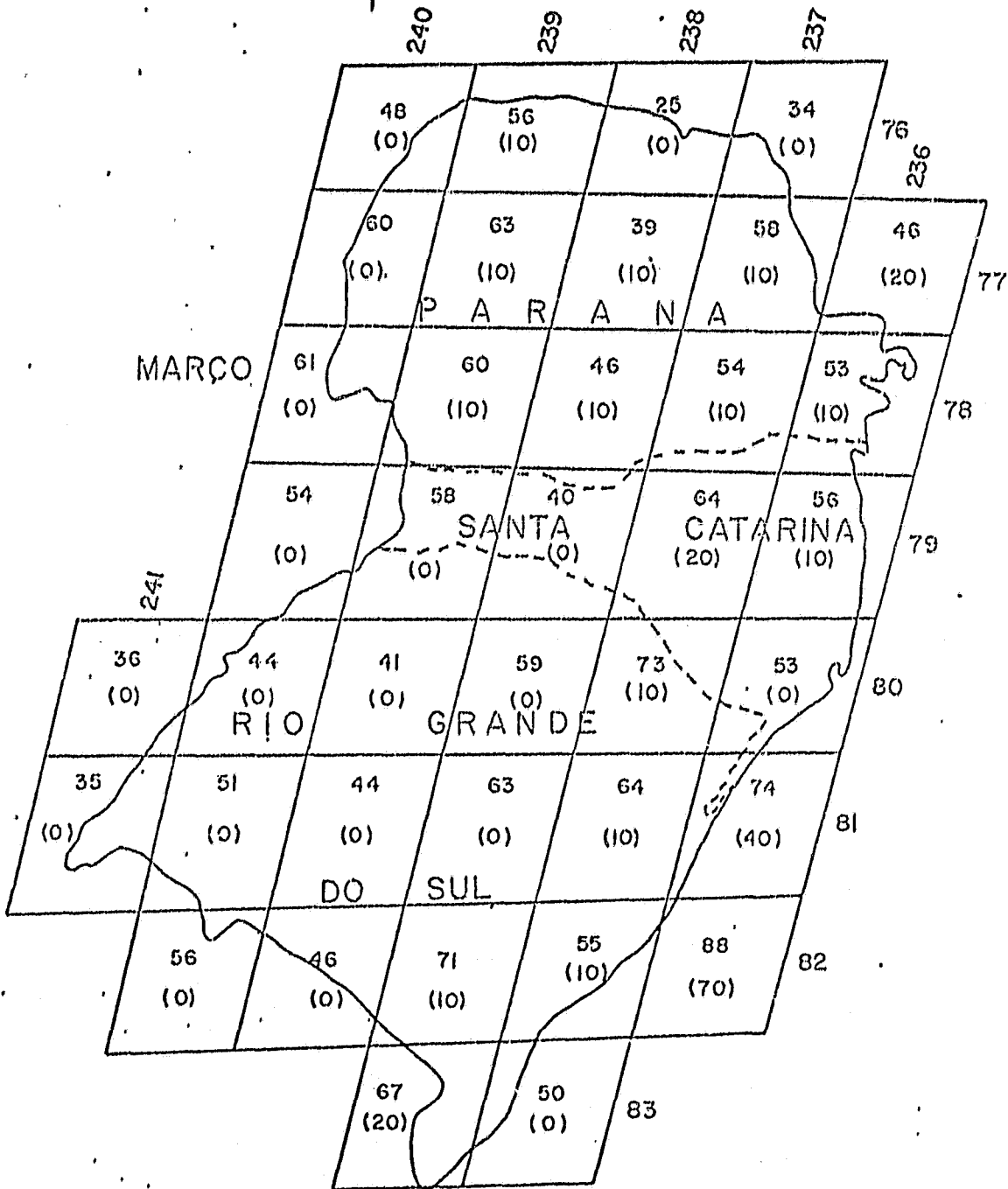
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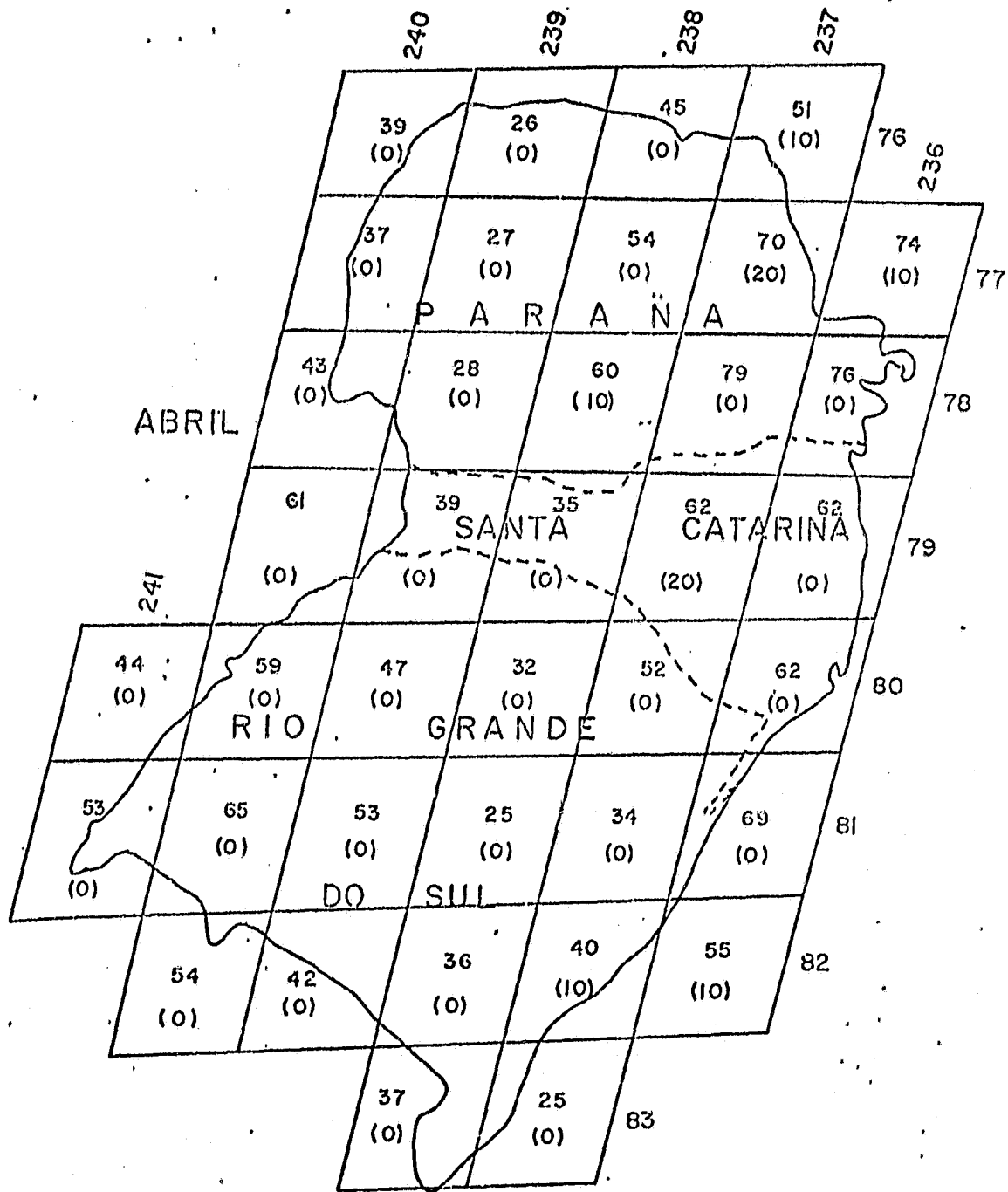
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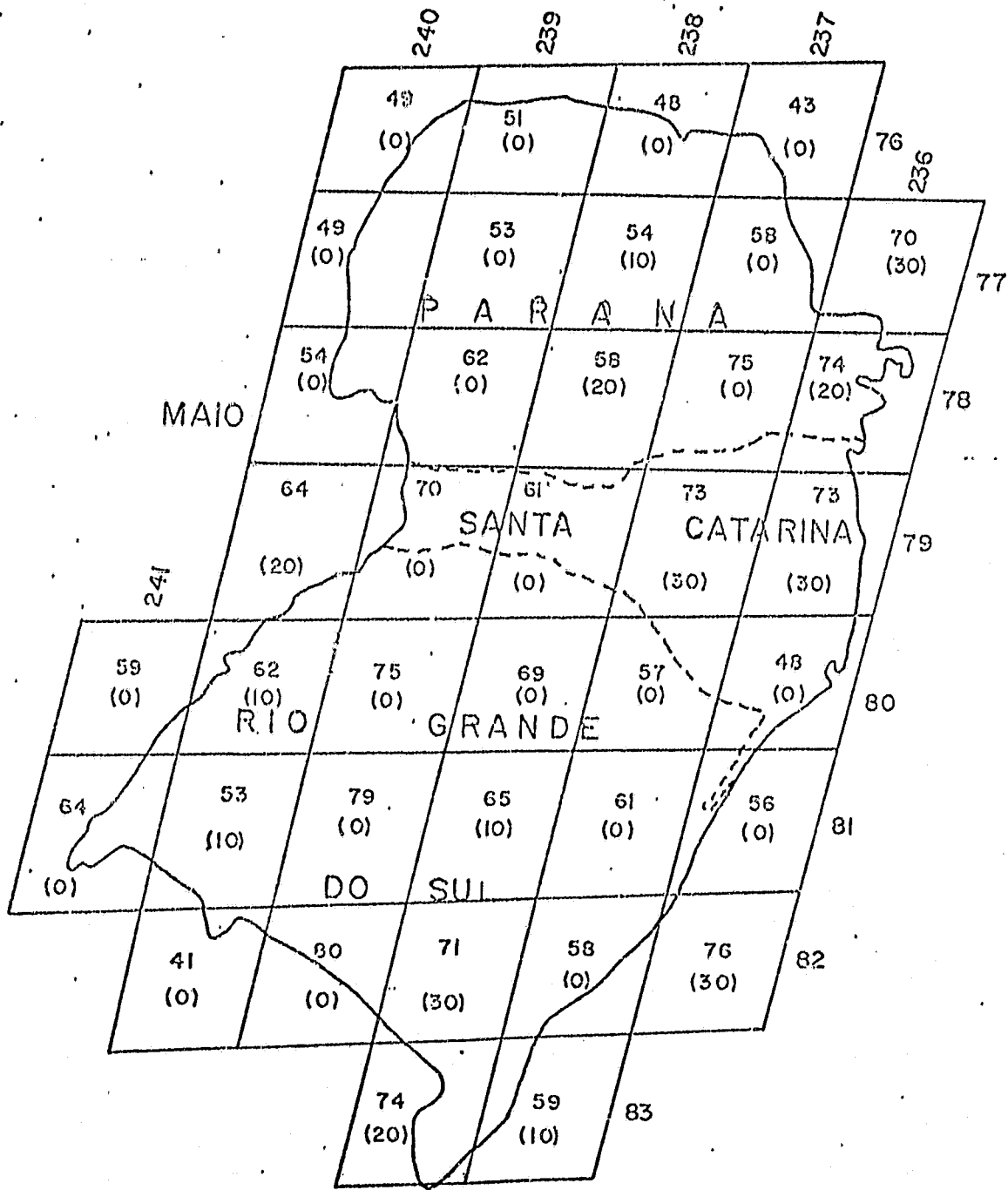
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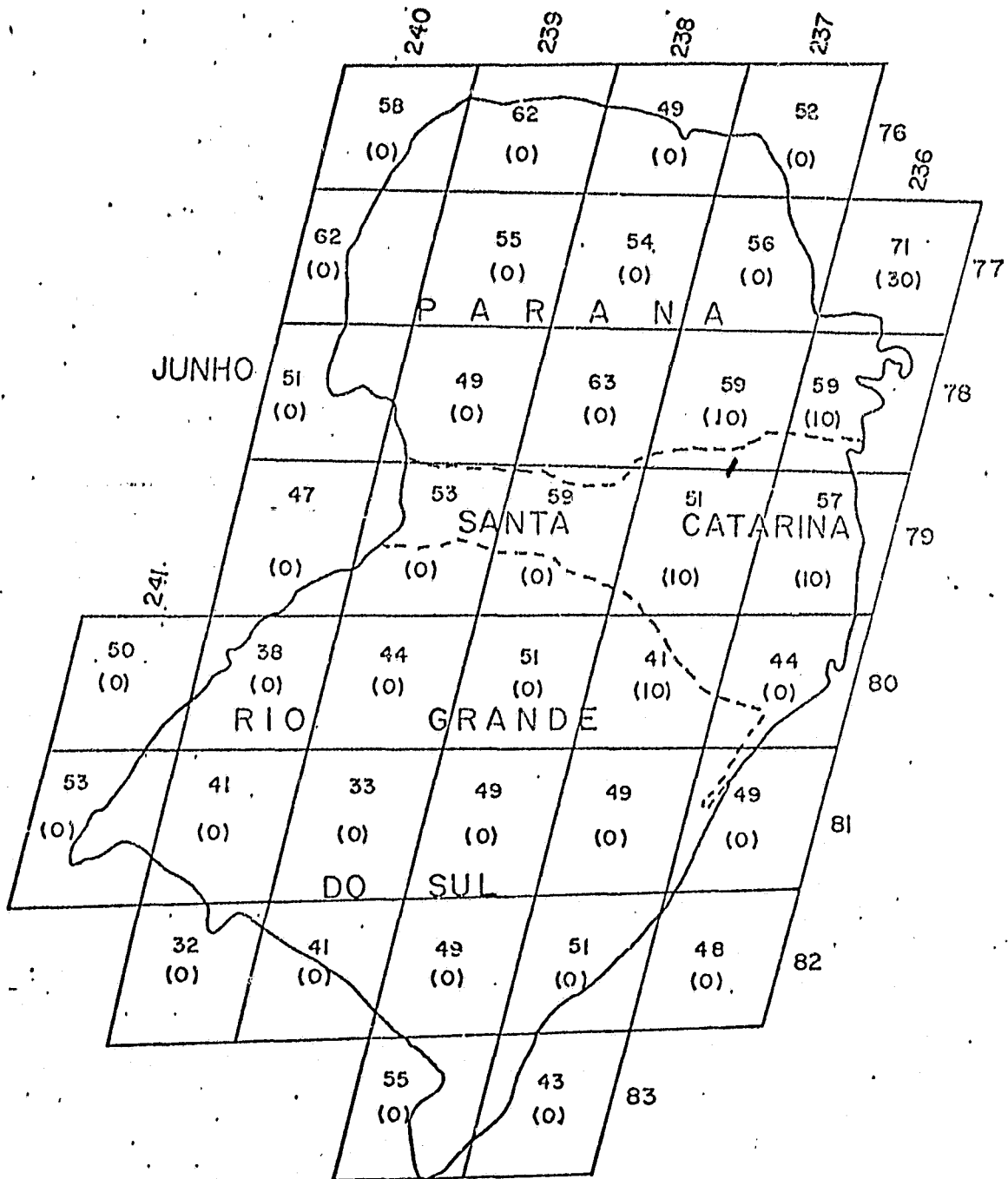
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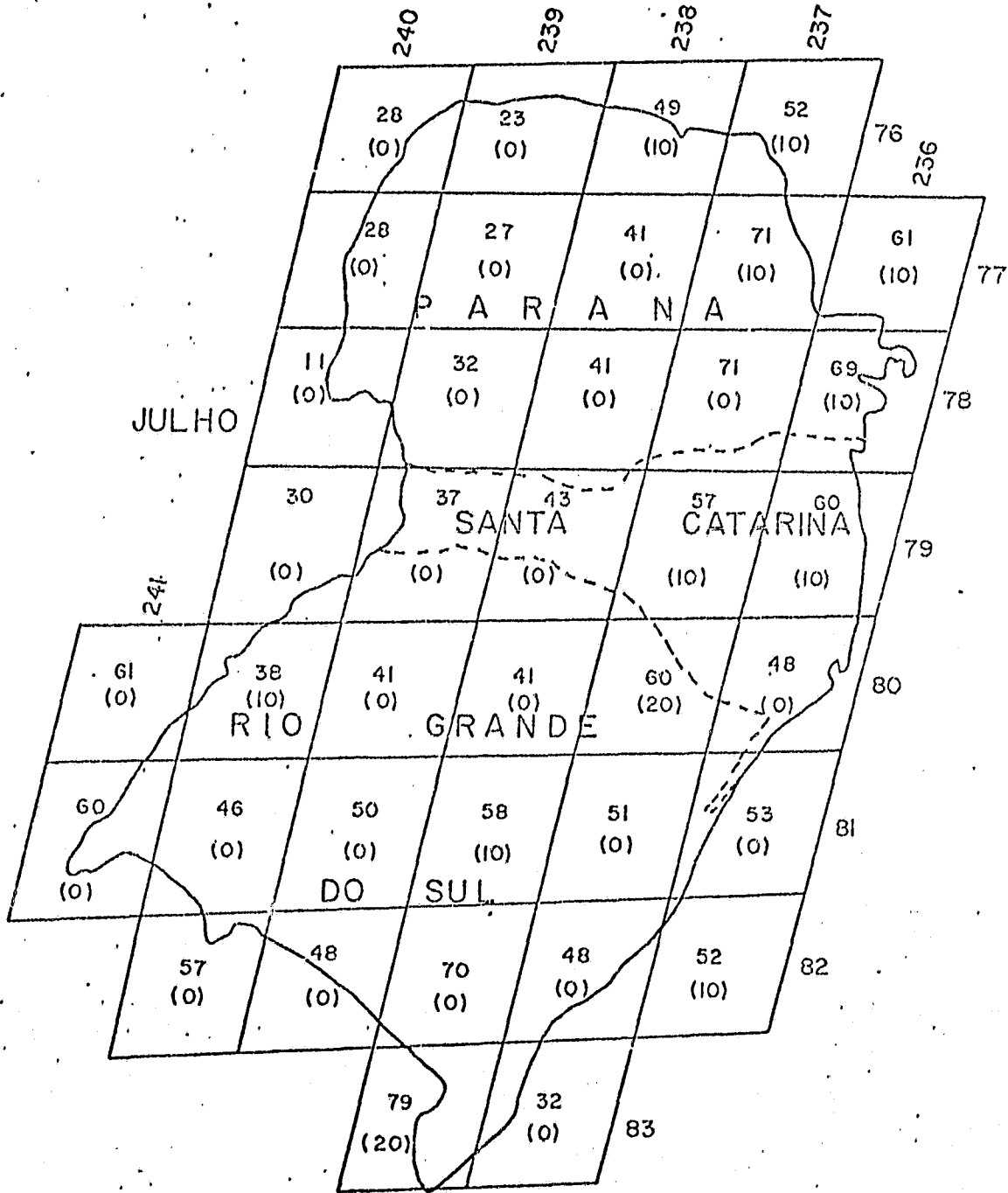


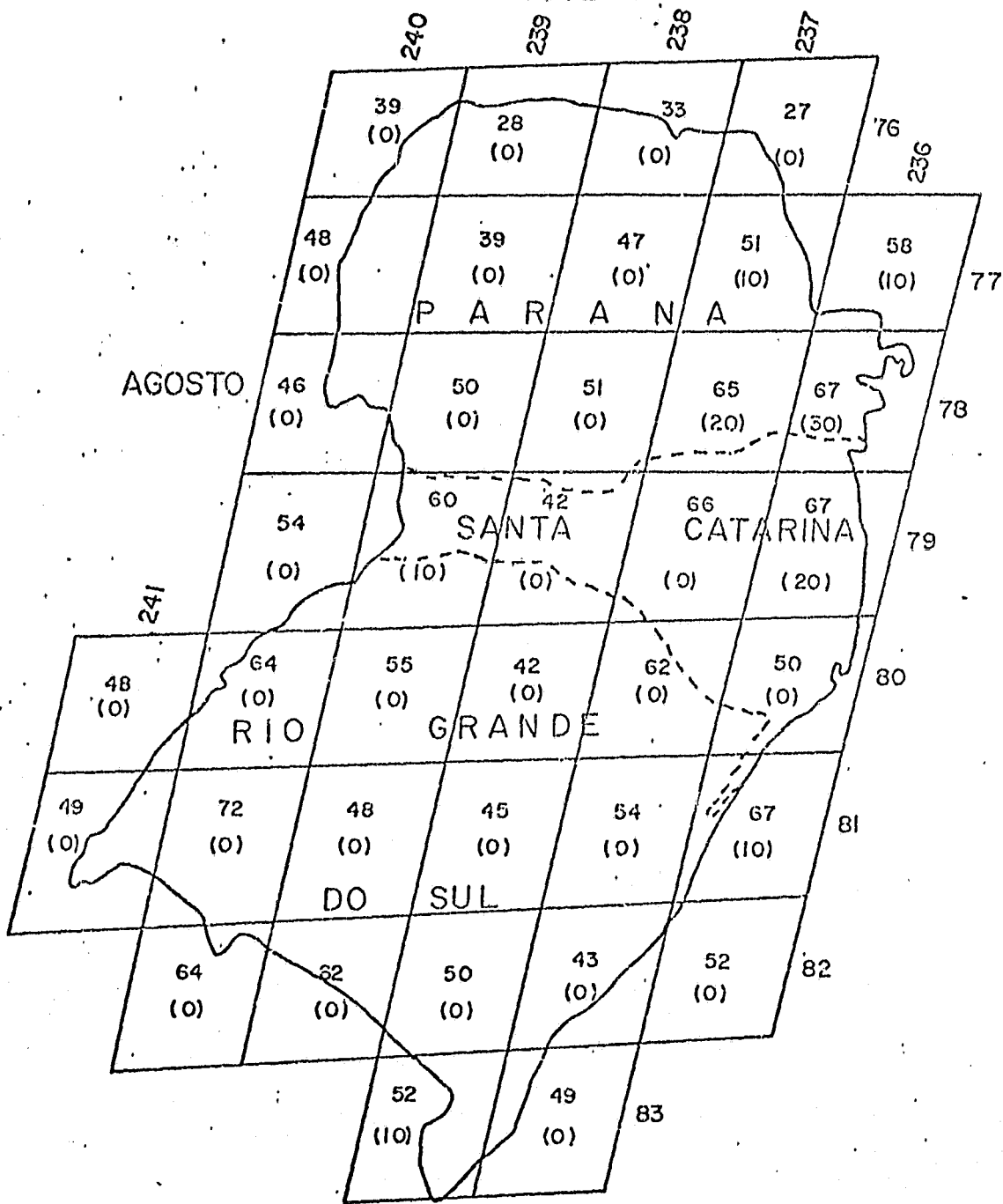
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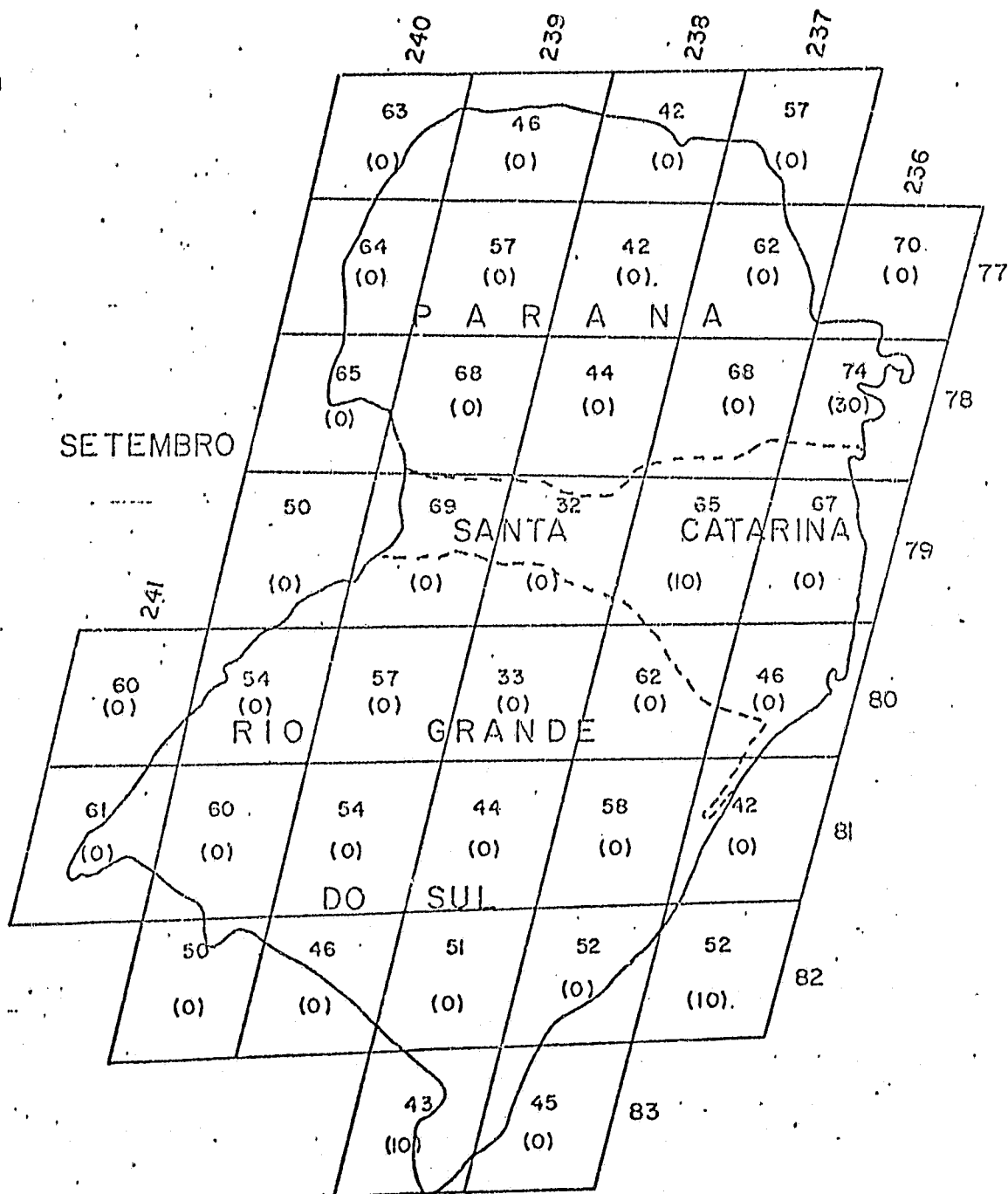
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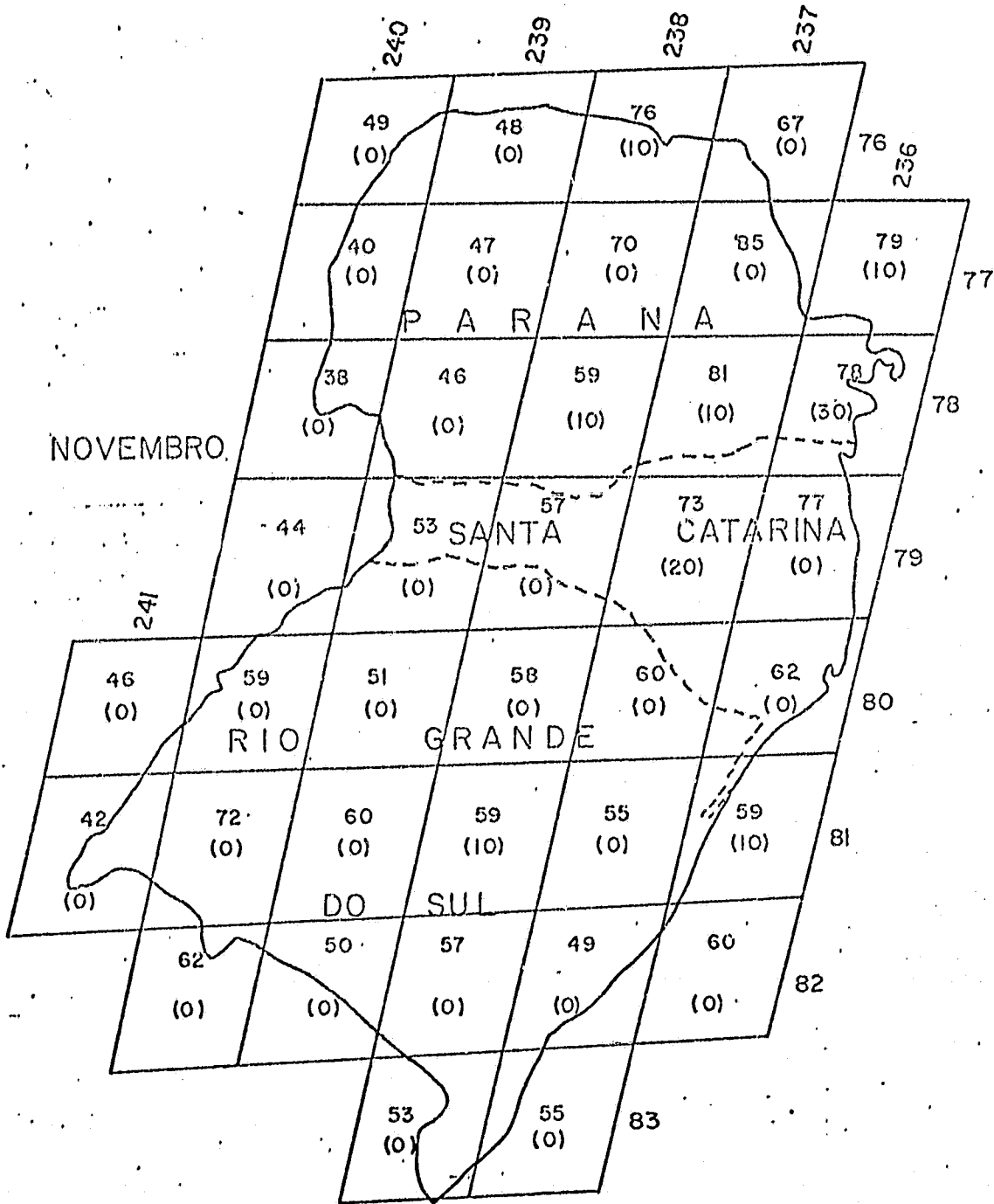




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