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# Regionalization of Water Resources Zones of Iran Using Precipitation Entropy

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## Abstract

Monthly precipitation records of 33794 station-year including 405528 individual observations have been analyzed using Shannon's entropy index. Spatial pattern of entropy index is highly comparable with dispersion of precipitation in Iran. This analysis showed that entropy index could be considered as an appropriate tool for delineation of water resources zones of the country. According to the mean annual precipitation and entropy index we can delineate four water resources zones in Iran.

**Keywords:** Precipitation, Water resources zones, Entropy, Iran

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(entropy theory)

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(information transmission)«

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$$H = -k \sum_{i=1}^K p_i \log p_i \quad (1)$$

H

k

P<sub>i</sub>

K

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$$H = - \sum_{i=1}^n p_i \log_2 p_i \quad (\text{bit}) \quad (2)$$

P<sub>i</sub>

n

H

$$H = \log_2 n$$

P<sub>i=1/n</sub>

n

n

H

P<sub>i</sub>

H

P<sub>i</sub>

P<sub>i</sub>

$$\log_2 n$$

( )

( P<sub>i</sub> )

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(P<sub>i</sub>)

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$$\begin{matrix} : \\ r_i \\ r_{12} \\ : \\ R = \sum_{i=1}^{12} r_i \end{matrix} \quad \begin{matrix} : \\ r_1 \\ i \\ ( ) \end{matrix}$$

$r_i$

:

R

R

( )

$r_n$   $r_1$   $i$

$P_i$

$R$

( )

$$P_i = \frac{r_i}{R}$$

( )

$P_i$

$i$

$$H = - \sum_{i=1}^n (r_i/R) \log_2(r_i/R) \quad (\text{bit}) \quad ( )$$

$R$

$r_i$

$H$

$H$

$R/n$

$H$

$(\text{Log}_2 n)$

$H$

$H$

( : )

$m$

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$$\bar{H} = (1/m) \sum^m H \quad (\text{bit}) \quad ( )$$

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$\bar{H}$

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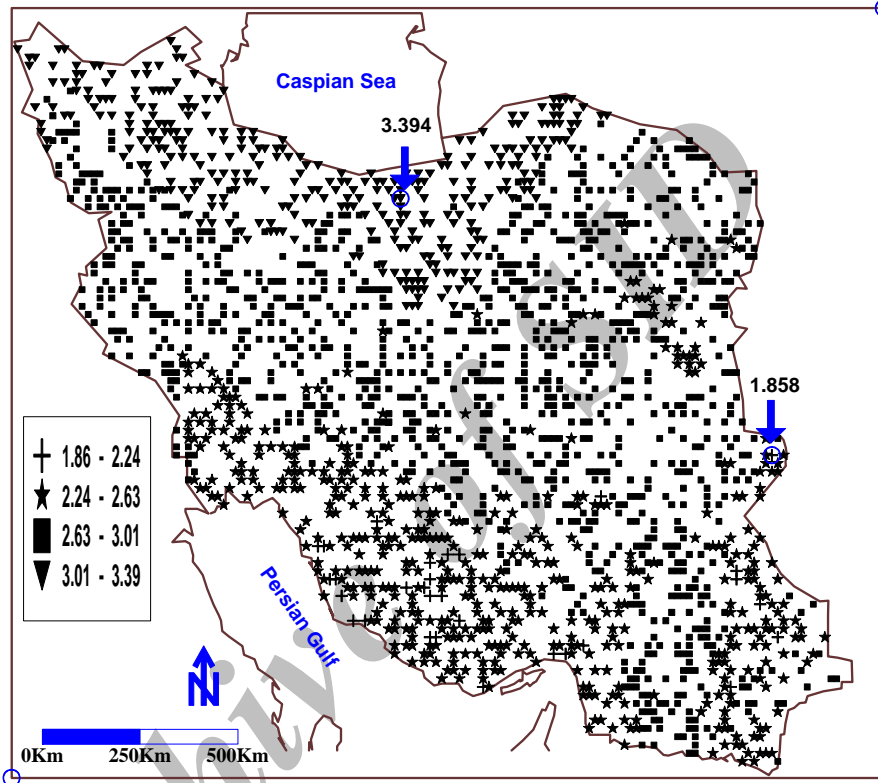
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H

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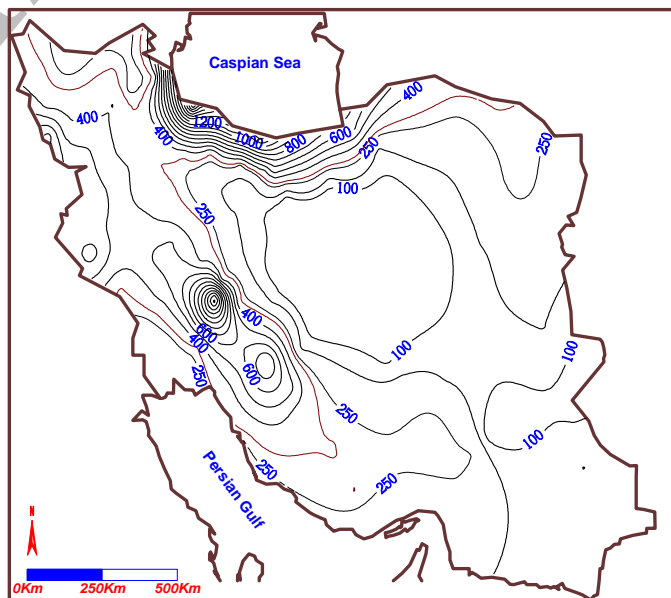
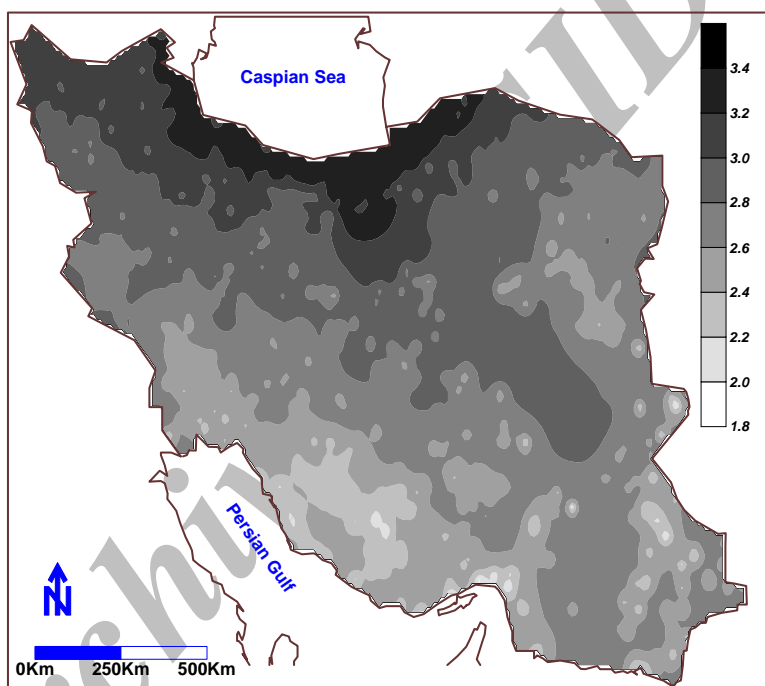


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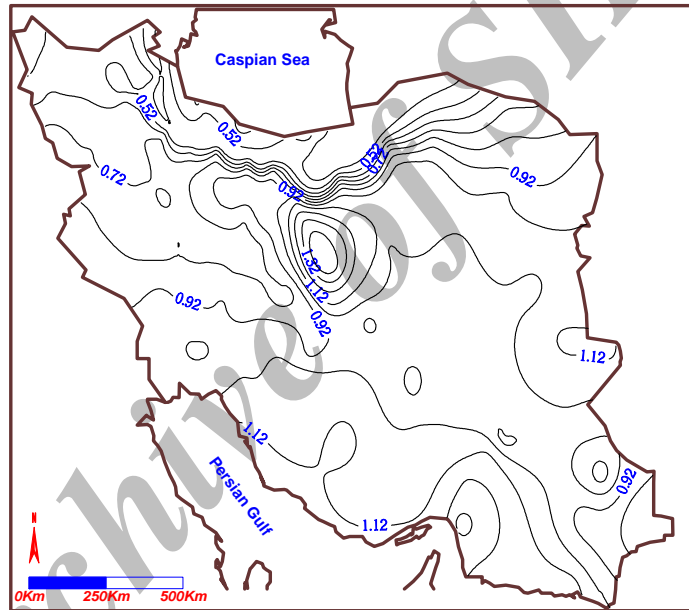
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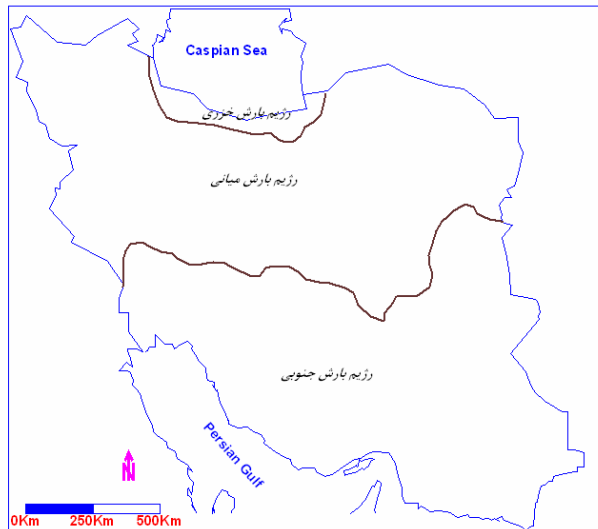


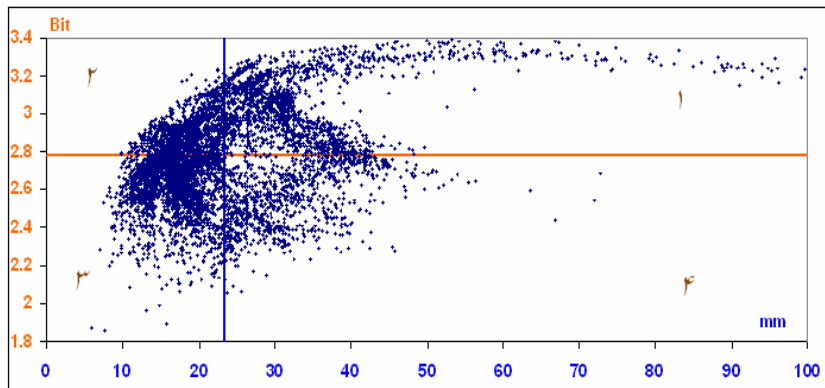
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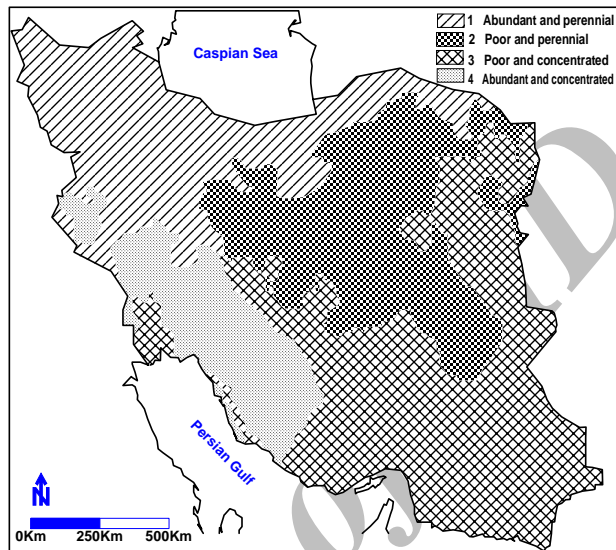
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