

## AN INDEX MONITORING THE SENSITIVITY TO DESERTIFICATION: ESPI

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### ABSTRACT

Moving from MEDALUS protocol - Mediterranean Desertification and Land Areas Use [1], the authors have recently defined an index - ESPI, Environmentally Sensitive Index Patch - that overcome the limitation of ESAI - Environmentally Sensitive Index, that is not to be able to express an overall assessment of sensitivity to desertification of territory whatever its extension - country, region, province, watershed, municipality, etc. [2]. The ESPI index considered by the authors has significant advantages, because it produces effective rankings, moreover classifications, consequent possibility to elaborate the comparative data with regard to different periods and, above all, the temporal monitoring of the phenomenon. ESPI summarizes the 8 classes and sub-classes MEDALUS in a unique class of sensitivity to desertification, 1-100 scale, where 1 is the minimum sensitive and 100 the maximum. The authors have recently tested the index ESPI to the entire region of Sicily [2] articulating the study on climate and considering it in 8 decades, precisely from 1990 to 2000 in 1921-30. The ESPI ranging from the worse condition (74.8) in the decade 1941-50, to the best (61.9) in the period 1990-2000. Subsequently the authors applied the index ESPI to three scenarios [3], the first half of the twentieth century, the second half of the twentieth century and the twenty-first century (2030). Moreover, the authors have developed an additional ESPI for Quality Climate (ESPI-CQI). It showed that the reduction of the areas having risk of desertification in Sicily between the first and second half of the last century, reduction amplified in the projection to 2030, is not due to the climate, that however undergoes a constant deterioration in the three periods analyzed.

In this contribution the authors apply ESPI-ESAI to the Mediterranean region of Sicily, Quality Climate is calculated on the basis of average annual meteorological data for the period 1931-2000. From the values of ESPI-ESAI calculated for the analyzed 70 years, emerges a reduction

of sensitivity of desertification. Let us point out that among the worst year (ESPI-ESAI = 80.8) and the best (ESPI-ESAI = 57.5) there is a gap of 23.3 percentage points.

The analysis allows to determine three indicators:

- ESPI-ESAI = 68.6 median value of seventy years
- ESPI-ESAI = 73.3 median value of 1st mid of XX century
- ESPI-ESAI = 66.0 median value of 2nd mid of XX century

The correlation line records from 1931 to 2000 a loss of 8 percentage points.

From the values of ESPI-CQI calculated and analyzed for the 70 years analyzed, comes out a rise of sensitivity of desertification.

In this case let us point out that among the worst year (ESPI-CQI = 94.2) and the best (ESPI-CQI = 47.2) there is a gap of 47 percentage points.

The analysis, also in this case, allows to determine three indicators:

- ESPI-CQI = 68.8 median value of seventy years
- ESPI-CQI = 65.7 median value of 1st mid of XX century
- ESPI-CQI = 72.9 median value of 2nd mid of XX century

The correlation line records from 1931 to 2000 a loss of 5 percentage points.

## **References**

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[3] Duro A., Piccione V., Ragusa A., Veneziano V. (in press) - *The Environmentally Sensitive Index Patch applied to MEDALUS Climate Quality Index*. AIP Conference Proceedings; (AIP) American Institute of Physics.