



## **Temporal and spatial variation of sunshine hours over Greece and detection of dimming/brightening periods**

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The network of stations of the Hellenic National Meteorological Service was used for the analysis of sunshine duration (SDu) measurements in Greece and the detection of long term variability and trends of this variable. In a limited number of stations, SDu observations were initiated during early 1960's, while for the rest of them during 1970's. Only 15 stations spread all over the country met the criteria set for data completeness and quality and thus were used for the study.

The analysis showed that sunshine hours in Greece reveal a prominent spatial and temporal variability. Mean values of the annual SDu over the studied period varied between almost 3000 hours in southeastern Greece (e.g. Rhodes) and 2200 hours (northwestern Greece). All stations present a remarkable temporal variability with sub periods of decreasing and increasing trends of SDu. In particular, annual SDu was found to present a decreasing trend until mid 1980's almost at all sites in the country. The decrease of SDu from 1960's to 1980's was more pronounced in western Greece, ranging from 5-10% of the total annual sunshine hours. Moreover, all examined stations experience an ongoing increase of the annual sunshine hours since mid 1980's or early 1990's. The increase is larger at the stations of southern Greece and amounts to +20hours/year in eastern Crete for the period from early 1980's to early 2000's.

Although sunshine duration is inversely related to total cloud cover, the observed increase of sunshine hours during last decades was not always accompanied with a simultaneous decrease of cloudiness. On the contrary, in some cases (e.g. in Athens), the increase of sunshine hours after 1983 was accompanied by synchronous increase in cloudiness amount. Under all sky conditions, the increase of the annual SDu in Athens amounts to 3% while under clear sky conditions to 9%.

These findings are consistent with the so called 'dimming/brightening' periods and points to the prominent role of atmospheric aerosols on dimming/brightening of the earth.