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Long term variability of sunshine hours in Athens and its relationship with air temperature

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Athens is a privileged Mediterranean area that enjoys sunny weather almost all over the year. Annual sums of sunshine duration correspond to 2880 hours (average value of the 1961-1990 period), while 60% of total sunshine hours is received from May to September.
At the historical station of the National Observatory of Athens (NOA), sunshine duration has been measured and published since the end of the 19th century, enabling the study of the variability of this climatic element for a period spanning more than one century.
According to the historical record, annual sums of sunshine hours follow a quite fluctuating pattern with long periods of dimming and periods of brightening. The overall long term linear trend of annual sunshine hours is positive and amounts to 18hrs/decade for the period 1897-2011. The brightest year of the time series is 1952, when 3222 sunshine hours were recorded at NOA.
As regards the period after mid 20th century, a dimming over Athens is observed from early 1950's to the early 1980's, followed by a period of brightening in the recent decades. These findings are consistent with findings over Central and West Europe. It was found that the detected brightening (on an annual base) from 1983 to 2011, is associated with an increase of sunshine hours during spring (+27hrs/decade), summer (+27hrs/decade) and autumn (+20hrs/decade), related possibly to increased frequency of anticyclonic situations. These trends are statistically significant (p value < 0.05). On the contrary, a negative trend (not statistically significant) of sunshine hours is observed in winter, for the same period.
Links between air temperature and sunshine duration hours in Athens were also investigated on a seasonal and monthly base. Positive linear correlations were found in summer and spring months and negative correlations during winter months as regards the minimum air temperature. The correlation coefficient between average (but also maximum) air temperature and sunshine hours was found to be equal to + 0.41 in summer and + 0.51 in spring for the whole time series (1897-2011). These values became much higher ($> + 0.7$) when the period after 1983 was considered. July was the month with the best correlation with sunshine hours (> 0.75) during recent decades.
The strong positive relationship between solar radiation and sunshine duration and the strong correlation between sunshine duration and air temperature may be useful in the climate change research of the area.