

## **Diurnal evolution of solar radiation in UV, PAR and NIR bands in high air masses**

### **Abstract**

Solar surface insolation appears constant from an everyday's point of view but this quantity has been found to be changing in small scale that may lead to climate change over an extended period of time. However, the factors impacting this variance are always a subject of much debate. In long term observations for low air masses, the variation is governed by cloud cover, aerosol loading, relative humidity as well as water vapor content. Parallel observations in high air masses for the variation of received solar radiation are rather lacking. To fill up the existing gap, this paper aims to investigate the diurnal evolution of solar radiation spectrum in UV, PAR and NIR bands in high air masses. In the current work, a total of 25 days of global and diffuse solar spectrum ranges from air mass 2 to 6 were collected using shadowband technique. It is found that the evolution pattern for all spectral components follows a high coefficient of determination with respect to global radiation. The result analysis also shows that variation of solar radiation is the least in UV fraction, followed by PAR and the most in NIR fraction. It is deduced that the broader amplitude of fraction in PAR and NIR because they incorporate variation of aerosol and water vapor. Decreasing trend in NIR fraction for constant UV fraction is likely associated to the increase of water vapor content. While reduction of PAR fraction for specific air mass interval is due to the increase in aerosol loading.