



Influence of solar activity on modes of tropospheric circulation variability

Ivan Dorotovic (1,2,3) and Isabel Trigo (4)

(1) Astronomical Observatory of Coimbra University-OAUC, Coimbra, Portugal (ivan@mat.uc.pt), (2) UNINOVA/Computational Intelligence Research Group-CA3, FCT UNL, Caparica, Portugal (id@uninova.pt), (3) Institute of Tropical Research-IICT, Lisbon, Portugal, (4) Institute of Meteorology, Lisbon, Portugal (Isabel.Trigo@meteo.pt)

Many phenomena at the Sun, in the interplanetary and near Earth space, play an important role in the solar-terrestrial system. An increasing number of studies indicate that variations in solar activity (SA) may have a significant impact on the atmosphere, spanning from the upper levels directly influencing space weather, to the ozone layer in the stratosphere, and down to the troposphere. The aim of this contribution is to identify the possible impacts of SA on the main modes of atmospheric variability in the Northern Hemisphere and the Northern Atlantic region in particular. As a first approach, we analyse the statistical distributions of the indices describing the North Atlantic Oscillation (NAO) and the Arctic Oscillation (AO) throughout the different phases of SA. We use the daily NAO and monthly AO indices available from the NOAA Climate Center (CPC), both corresponding to the projection of daily/monthly fields of 1000 hPa geopotential height onto the respective loadings obtained from a Principal Component Analysis. Periods of low, average, high SA, respectively have been identified using the Wolf sunspot numbers (Solar influences Data Analysis Center-SIDC) and the F10.7 index (NOAA National Geophysical data Center-NGDC). The probability density functions (PDFs), for those different phases of the SA, of the AO will be analysed for monthly to seasonal scales, while the PDFs of the NAO aggregated for temporal scales ranging from weekly to seasonal are also described.