Dr. Dimitris Kaskaoutis of School of Natural Sciences, SNU, and his collaborators have just published a paper in the journal, "***Global and Planetary Change***" (January 2016) introducing **a new climatology index** named **CasHKI** (Caspian Sea-Hindu Kush Index), which is responsible for large fluctuations in dust activity over southwest (SW) Asia...

In an earlier paper published in Climate Dynamics in 2015, the team had identified that the dust storms in the eastern part of Iran were associated with positive mean sea-level pressure (MSLP) **anomalies** over the Caspian Sea (CS) and negative ones over the Hindu-Kush (HK)/ Pamir mountains.

Dr. Kaskaoutis says, "After some months of comprehensive analysis, we quantified these anomalies into the new CasHKI index, which is strongly associated with the dust activity over SW Asia. The definition of the new climatology index is CasHKI = MSLPanom.CS – MSLPanom.HK, over specific domains taken over the CS and HK. The higher the CasHKI, the larger the dust activity (dust emissions, uplift, transport). Why?"

"The positive anomalies over the Caspian Sea (CS) along with the negative ones over Hindu Kush (HK) enhance the pressure gradient and the strong northern wind (named Levar) along the eastern Iranian borders. So, these cases correspond to the high CasHKI mode, which intensifies the northern winds and activates the dust sources over the region. The results (increase in dust activity) are really spectacular; even I did not expect such a large variation! These results were justified by multiple (Meteosat, OMI, MODIS) satellite observations and model (MIROC-SPRINTARS) simulations, which revealed a large increase in dust emissions and loading over SW Asia for high CasHKI values. In synopsis, the present work revealed for the first time that the variability in dust activity over SW Asia is significantly driven by CasHKI variations, i.e. changes in MSLP patterns over the CS (primarily) and HK (secondarily) that control the regional Levar wind. On the other hand, CasHKI variations do not seem to affect significantly the Indian summer monsoon rainfall, except some increases in rainfall over IGP and the Himalayan range."

The study has already drawn the attention of the scientific community. The whole analysis is now being continued covering all months (not only the summer) and a longer period (1963-2014).

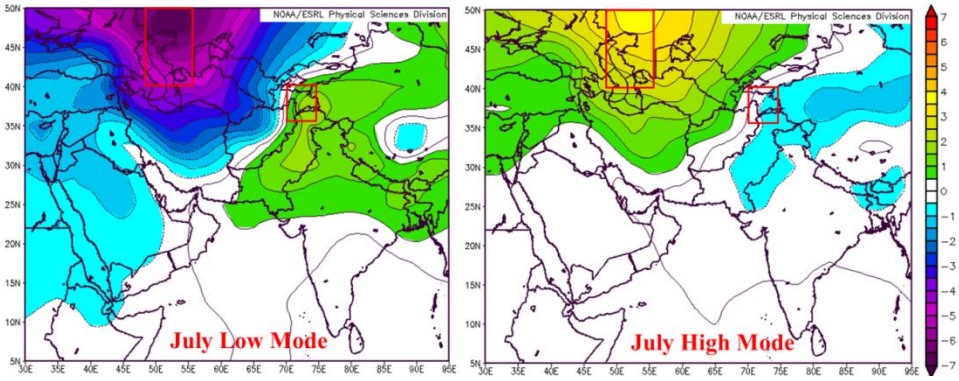

Figure 1: Composite means of Mean Sea-Level Pressure anomalies for low and high CasHKI modes during July 2000-2014. The spatial domains over the Caspian Sea and Hindu Kush used for the CasHKI calculation are shown as red rectangles.

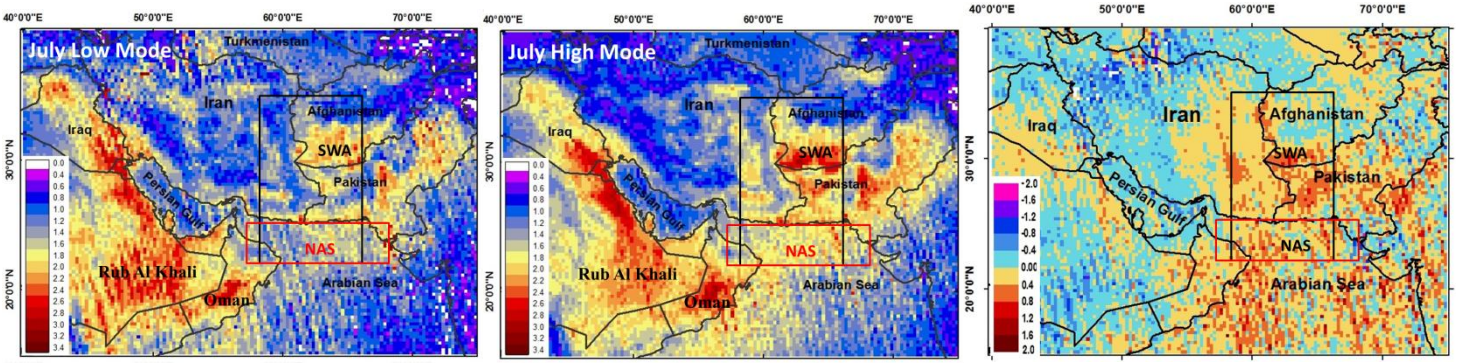

Figure 2: Mean spatial distribution of OMI-Aerosol Index (AI) for low and high CasHKI modes in July 2006-2014. The AI differences between the high and low CasHKI modes are plotted in the rightmost column. The AI is a fingerprint for dust aerosol, indicating much higher aerosol loading for the case of the high CasHKI mode over SW Asia and northern part of the Arabian Sea.