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Near-surface water vapour estimated from IR satellite observations -application for Black Sea

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Water vapor is a key climate variable, having a dominant role in the radiative balance and in the hydrological cycle. Over sea areas in particular, knowledge of water vapor distribution and variability, especially at fine scales, is important for improved understanding of air-sea interaction processes - like estimation of latent heat fluxes and their impact on the generation and development of local-scale severe weather events (e.g. waterspouts). Satellite observations and derived products offer the unique oportunity of monitoring open-sea areas with respect to variability and distribution of atmospheric parameters, including water-vapor related variables. However, derivation of reliable information about near-surface moisture from satellite observations is still under investigation, due to the inherent limitations of such observations to describe the very thin atmospheric layer of interest.
In this study we investigate the possibility to describe near-surface water vapor variability from IR satellite products. We use moisture and temperature profiles available from IASI (Infrared Atmospheric Sounding Interferometer) and MODIS (Moderate Resolution Imaging Spectroradiometer) L2 products, with a focus on Black Sea basin. A multilinear regression model is derived based on available data in those products and it is applied on independent data provided by long-term radiosounding measurements at 6 coastal stations in the Black Sea basin, and compared too with ERA-INTERIM data. The results allow also some conclusions about the representativity of coastal measurements of moisture for the open-sea environment.