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Using Meteosat-10 and GPS ZWD measurements for creating regional water vapor maps.

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Water vapor (WV) is one of the greenhouse gases, which plays a crucial role in global warming. It's investigation is of great importance for climate and global warming studies. One of the main difficulties of such studies is that WV varies constantly across the lower part of the atmosphere. Currently, most of studies provides WV estimations using only one technique such as tropospheric GPS path delays [Duan et al.] or multi-spectral reflected measurements from different meteorological satellites such as the Meteosat series [Schroedter et al.]. Constructing WV maps using only interpolated GPS zenith wet delay (ZWD) estimations has a main disadvantage – it doesn't take in account clouds which are located outside the integrated GPS paths. Using our previous work [Leontiev, Reuveni, in review] we were able to estimate Meteosat-10 7.3 μm WV pixel values by extracting the mathematical dependency between the WV amount calculated using GPS ZWD and the Meteosat-10 data. Here, we present a new strategy which combines these two approaches for WV estimation by using the mathematical dependency between GPS-ZWD and Meteosat-10 in order to evaluate the WV amount at cloudy conditions when preforming the interpolation between adjusted GPS station inside our network. This approach increases the accuracy of the estimated regional water vapor maps.

References:

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