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Water vapor transport in observations and in the regional climate model COSMO-CLM

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Atmospheric water vapor plays an important role in the climate system. It is the major greenhouse gas and links distant water storages like the oceans, rivers, lakes, and soil moisture in the hydrological cycle. We present the global vertically integrated water vapor transport based on HOAPS satellite and ERA-Interim reanalysis data for the time period from December 1987 to November 2014. A special focus lies on the Mediterranean Sea, which is an important source of moisture in North Africa and Europe. For example, the so-called Vb-cyclones carry water vapor from the Mediterranean to the eastern part of Central Europe and often cause high precipitation totals and flooding there, like the Elbe flood in August 2002. One goal of the DFG Research Unit SPATE is to investigate the atmospheric drivers of extreme floods. Therefore, our regional climate simulations should well represent the water vapor transport. For evaluation, we compare the water vapor transport in HOAPS satellite and ERA-Interim reanalysis data during selected Vb-events with the regional climate model COSMO-CLM in two different modes. On the one hand, we used the atmosphere-only mode, and on the other hand, COSMO-CLM coupled with the regional ocean models NEMO-Nordic (Baltic Sea) and NEMO-MED (Mediterranean Sea).