Global Atmospheric Rivers Depicted from Satellite and NWP Reanalysis, and Their Connection to Weather and Climate Phenomenon

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Atmospheric River (AR) has recently gained intense atmospheric/meterologial/hydrological research interests due to its central role in the global water cycle, such as water vapor transport and extreme rainfall. We have developed an objective methodology for detecting AR's that can be applied to global field of total precipitable water (TPW). Tests have included application to ERA-Interim and the MiRS ATMS TPW fields and have shown its utility in detecting global AR's contributing to recent flooding events across the U.S. and Europe. The importance of such a tool is that a global climatology of AR's can be developed on both satellite and NWP reanalysis data sets to investigate changes in the characteristics over time in the AR's, and link them to meteorological and/or climate events. We have tried to connect the AR output with weather and climate phenomenon, and the results are promising.