

At what spatial and temporal scales do we gain useful information from stable water isotope observations?

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Stable water isotope observations have become far more accessible in the recent decade, in particular for water vapour measurements. The new stream of observations creates a trend towards a more data-driven science, and opens up new opportunities, but also new challenges and questions. Using data from different observation platforms and sample types, including aircraft, ship, and stationary measurements, I illustrate opportunities and challenges, and explore the temporal and spatial scales where reliable enough information can be retrieved from different stable water isotope observations to develop new process understanding, but also to guide efforts aimed at improving model representations of processes in the atmospheric water cycle.