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Hydras+ Improving Drought Monitoring by Assimilating multi-source Remote Sensing Observations into Hydrologic Models

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Given the expected increase in extreme events due to climate change, more drought events can be expected in the future. These events have often devastating impacts on society and the environment. Adequate monitoring of these events within disaster management is therefore of utmost importance. Remote sensing can provide important information, though does not allow for a complete assessment of droughts as (1) only measurements of the surface are obtained and (2) the spatial and temporal resolutions are often too coarse. Combining remote sensing with land surface models is generally opted for, and is already in place in many drought monitoring systems. However, prediction of drought events (occurrence, intensity, frequency) can be improved by improving modelling approaches via the assimilation of multiple sources of remote sensing data. If both remote sensing observation and model reliability and accuracy can be enhanced, a more precise monitoring and modelling is expected, and therefore improved drought forecast is possible.

Within the recently initiated BELSPO/FNR funded HYDRAS+ project, research on these domains is carried out demonstrating the benefits of jointly assimilating several remote sensing sources (e.g. Sentinel 1, SMOS, SMAP) in land surface models for improved drought monitoring and prediction. It furthermore aims at assessing whether conceptual models (SUPERFLEX) can be used instead of complex and computation-expensive land surface models (CLM 4.5). If such models can be used, a faster computation of droughts at very large scale becomes possible.

The findings will not be used to set up a standalone drought monitoring system but rather be used to potentially improve currently existing systems. Any improvement in the currently available systems will have important positive consequences with respect to disaster management as it will allow for an improved management of resources.