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Exploring trends for the H SAF ASCAT root-zone soil moisture data records

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Environmental (e.g. floods, droughts) and weather prediction systems rely on an accurate representation of soil moisture (SM). The EUMETSAT H SAF aims to provide high quality satellite-based hydrological products, including SM.
ECMWF is producing ASCAT root zone SM for H SAF. The production relies on an Extended Kalman filter to retrieve root zone SM from surface SM satellite data. A 10 km sampling reanalysis product (1992-2020) forced by ERA5 atmospheric fields (H141/H142) is produced for H SAF, which assimilates ERS/SCAT (1992-2006) and ASCAT-A/B/C (2007-2020) derived surface SM. The root-zone SM performance is validated using sparse in situ observations globally and generally demonstrates a positive and consistent correlation over the period. A negative trend in root-zone SM is found during summer and autumn months over much of Europe during the period (1992-2020). This is consistent with expected climate change impacts and is particularly alarming over the water-scarce Mediterranean region. The recent hot and dry summer of 2019 and dry spring of 2020 are well captured by negative root-zone SM anomalies. Plans for the future H SAF data record products will be presented, including the assimilation of high-resolution EPS-SCA-derived soil moisture data.