



Remote Sensing

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## Remote Sensing of Regional Soil Moisture

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Requests for regional soil moisture observations are increasing to parameterize complex hydrological models, to assess the impact of land-use changes, and to develop climate adaption strategies in the agricultural sector. Spatial land-use patterns have an impact on the soil water balance and groundwater recharge. Soil moisture is a key parameter for the long-term monitoring and development of sustainable land-management and landscape design strategies that mitigate regional water scarcity and droughts. For example, the spatial organization of hedges or tree rows related to open land and wind direction avoids soil erosion, limits local evaporation, and increases local soil water storage. Since the early 1980s, satellite missions have been designed to monitor proxies for soil moisture, mainly at the national and global scale, with a relatively coarse pixel resolution and low accuracy. The local effects of weather and climate are very dynamic in space and time. Thus, a strong need exists for more accurate, regional-scale remote sensing products for soil moisture. The transfer of existing, proof-of-concept algorithms to region-specific monitoring frameworks is urgent. This SI provides an overview of current developments on remote sensing-based soil moisture observations that are applicable at a regional scale. The compendium of research papers demonstrates the benefits of concurrently utilizing multi-source remote sensing data and in situ measurements through: Using additional data and site-specific knowledge; Combining empirical and physical approaches; Developing concepts to deal with mixed pixels.



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