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Linking the Dynamic ASCAT Backscatter-Incidence Angle Relation to Vegetation Water Dynamics

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Through the water-uptake at their roots, and the transpiration at their leaves, vegetation plays a key role in the movement of water from the soil to the atmosphere. To improve our understanding of processes dictating the uptake and transpiration of water by vegetation at large scales, dynamics of vegetation water content are an important source of information. Active microwave instruments have been used for decades to estimate vegetation water content, owing to their high sensitivity to water at earth's surface. Recent developments in the retrieval of normalised C-band backscatter and the associated backscatter-incidence angle relation from the ASCAT scatterometer onboard the series of Metop satellites have enabled the use of the dynamic backscatter-incidence angle relation for monitoring of vegetation water content from sub-seasonal to multi-year time scale. The result is a global data record of daily estimates of the backscatter-incidence angle relation spanning 2007 to 2025. Additionaly, measurements from the scatterometer onboard the ERS and the future Metop-SG B satellite series, respectfully preceding and succeeding ASCAT, can be included to create a record spanning multiple decades. In this contribution, the spatial and temporal variation of the ASCAT backscatter-incidence angle relation are linked to dynamics of vegetation water content and biomass in different settings to demonstrate the potential of the dynamic C-band backscatter-incidence angle relation for monitoring of vegetation water dynamics.