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Monitoring vegetation dynamics in the Amazon with RapidScat

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Several studies affiliated diurnal variations in radar backscatter over the Amazon [1,2] with vegetation water stress. Recent studies on tree and corn canopies [3,4] have demonstrated that during periods of low soil moisture availability, the total radar backscatter is primarily sensitive to changes in leaf water content, highlighting the potential of radar for water stress detection.

The RapidScat mission (K_u-band, 13.4GHz), mounted on the International Space Station, observes the Earth in a non-sun-synchronous orbit [5]. This unique orbit allows for reconstructing diurnal cycles of radar backscatter. We hypothesize that the state of the canopy is a significant portion of the diurnal variations observed in the radar backscatter. Recent, yet inconclusive, analyses support the theory of the impact of vegetation water content on diurnal variation in RapidScat radar backscatter over the Amazon and Congo. Linking ground measurements of canopy dynamics to radar backscatter will allow further exploration of the possibilities for monitoring vegetation dynamics.

Our presentation focuses of two parts. First, we reconstruct diurnal cycles of RapidScat backscatter over the Amazon, and study its variation over time. Second, we analyze the pre-dawn backscatter over time. The water content at this time of day is a measure of water stress, and might therefore be visible in the backscatter time series.

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