Soil moisture impacts on InSAR

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We use an unusually strong tropical cyclone that impacted the southern coast of the Arabian Peninsula in May, 2018, to characterize the effects that variations in soil moisture have on the statistical behavior of complex-valued interferometric synthetic aperture radar observations and on the associated changes in derived products (including coherence and downlooked interferogram properties) and observations at different polarization. The lack of vegetation in this region removes a common source of uncertainty in SAR phase/coherence analysis, and the sharp transition between regions that were impacted by rainfall and those that were not helps mitigate some of the large tropospheric and ionospheric effects that are common in this area.

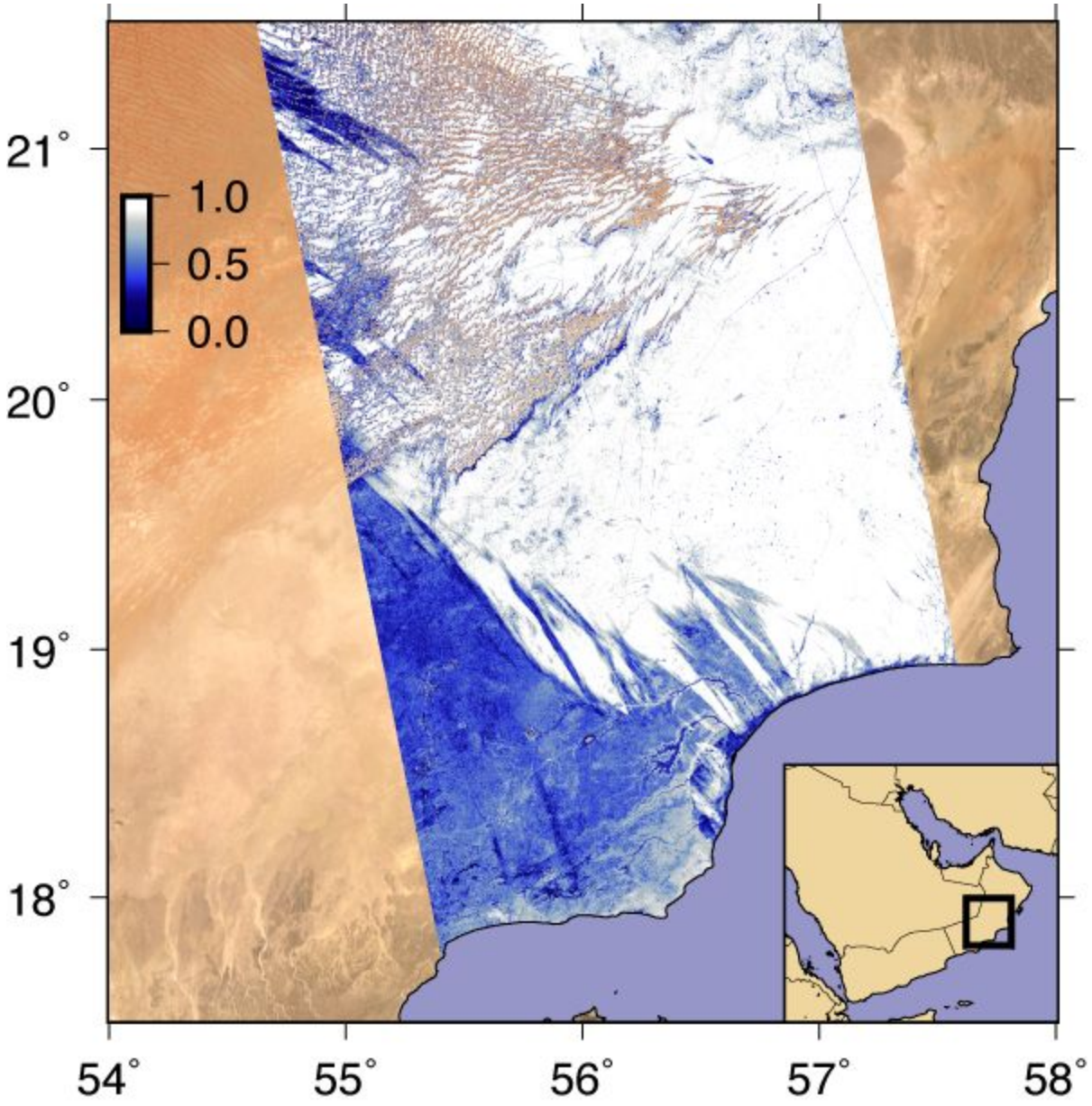

Figure: Study location, with transient coherence change during the time period May14-May28, 2018 (colorbar) overlain on optical imagery from Sentinel-2, with regions that are continuously low-coherence (oceans, sand dunes) masked out. Transition from white to dark blue marks the edge of rainfall during Typhoon Mekunu (May 24-26, 2018). Dots mark target points shown in other figures. Box indicates the footprint of the SMAP pixel used for comparison.