

Soil Moisture: SLAP – E. Kim

Preliminary SLAP soil moisture imagery

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Preliminary SLAP soil moisture data from LIAISE 2021

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SLAP Description

- NASA Goddard's Scanning L-band Active Passive (SLAP) is
- an airborne SMAP simulator with both passive (1.4 GHz) and active (1.2 GHz) microwave imaging capability
 - Radiometer is 4-Stokes w/SMAP's digital backend + RFI processor + enhancements; footprints 100x20m from 1000 ft AGL
 - Radar is a quad-pol scatterometer; footprints 350m from 2500 ft AGL (radar minimum altitude)
 - Swath widths up to 8km/4.2nm (at 11500 ft AGL)
 - Compatible with several aircraft, currently on a King Air
 - 1400km range in 4.5 hrs; day/night/VFR/IFR

(right) SLAP on bottom of NASA Langley King Air (UC-12) aircraft.



Soil moisture algorithm

Soil moisture (SM) algorithm input:

- Brightness temperature at 1.4 GHz (V-pol preferred)

Algorithm Output: volumetric soil moisture (m³/m³)

Ancillary data required:

- Soil surface temperature
- Soil surface roughness
- Soil texture (sand%, clay%)
- Vegetation water content (kg/m²)
- Incidence angle

NOTES:

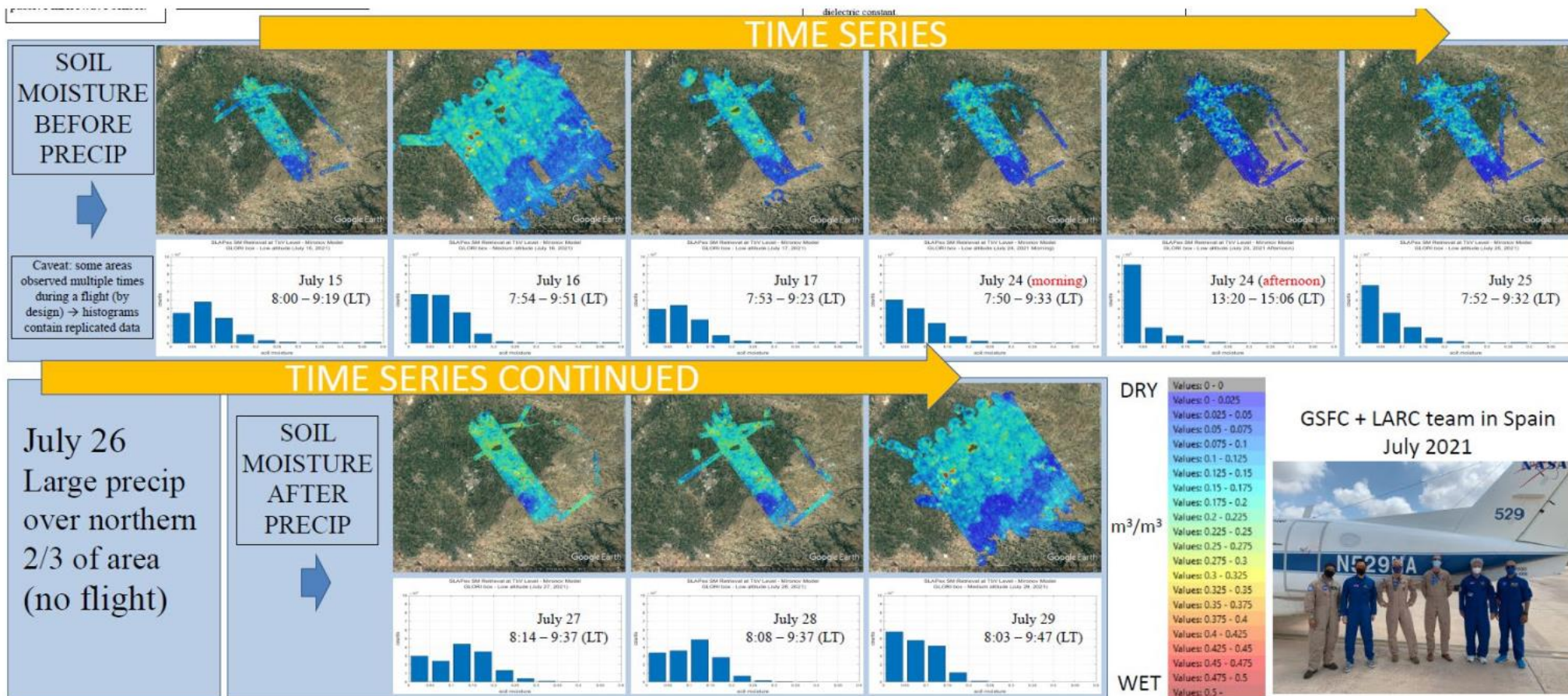
- SM is calculated for each footprint (100x200m), but requires ancillary data at this resolution to capture the corresponding SM variability
- Default ancillary data (used to generate images on next slide): use nominal constant values across the observed area
- Where detailed ancillary data values are available, they can be used in place of the nominal values to achieve (presumably) better accuracy
- **Please help us find fine-scale ancillary data**

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SLAP soil moisture time series



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