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Kauzar Saleh Contell, Ernesto Lopez-Baeza, Jean-Pierre Wigneron, Silvia Enache Juglea, Carmen Antolin, Yann H. Kerr, Cristina Millan-Scheiding, Mickaël Pardé, Mehrez Zribi

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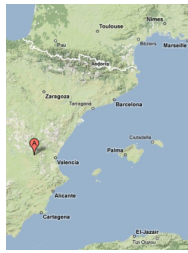
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AIRBORNE RADIOMETRY EXPERIMENTS FOR THE VALIDATION OF THE SMOS ALGORITHM L-MEB AT THE VALENCIA SITE (SPAIN)

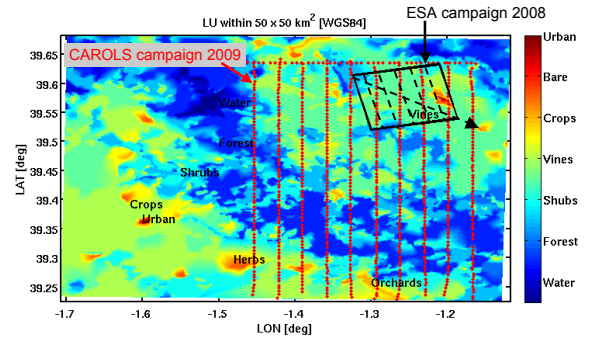
K. Saleh⁽¹⁾, E. López-Baeza⁽²⁾, J.P. Wigneron⁽³⁾, S.Juglea⁽⁴⁾, C.Antolín⁽²⁾, Y. Kerr⁽⁴⁾, C. Millán-Scheiding⁽²⁾, M. Pardé⁽⁵⁾, M. Zribi⁽⁴⁾



1. AIRBORNE CAMPAIGNS: ESA REHEARSAL CAMPAIGN 2008 & CNES CAROLS CAMPAIGN 2009

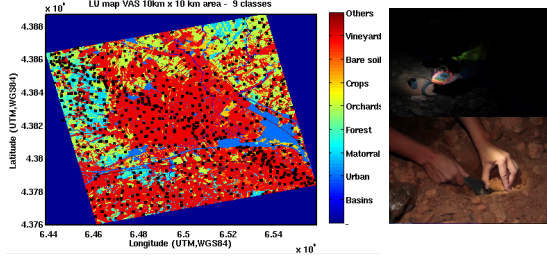


Description	ESA REHEARSAL-2008	CAROLS-2009
Radiometer	EMIRAD	CAROLS
Frequency (GHz)	1400-1427 (-1dB)	1400-1427 (-1dB)
Polarisation	Fully polarimetric	Fully polarimetric
Radiometric sensitivity (K)	0.1 for 1-s integration	0.1 for 1-s integration
Antenna configuration	Along-track	Across-track
Antenna aperture (-3dB) (deg)	38° (nadir) 31° (off-nadir)	37.6° (nadir and off-nadir)
Antenna type	Potter horn	Potter horn
Footprint size at nadir (-3dB) (m)	600	3000
Footprint size off-nadir (-3dB) (m)	1000	5000
Nr. of flight lines per day (Nr of flights)	1 (3)	10 (3)
Area covered	10 km	26 km x 55 km

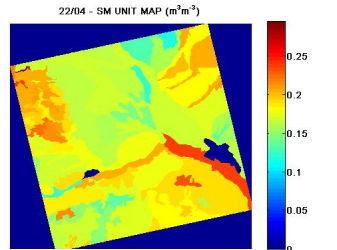


2. REFERENCE SOIL MOISTURE

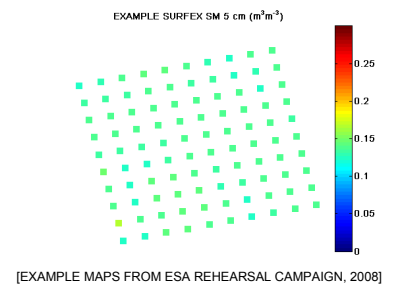
1) INTENSIVE FIELD MEASUREMENTS



2) MAPS OF HOMOGENEOUS SOIL MOISTURE UNITS



3) SURFEX-DERIVED SOIL MOISTURE

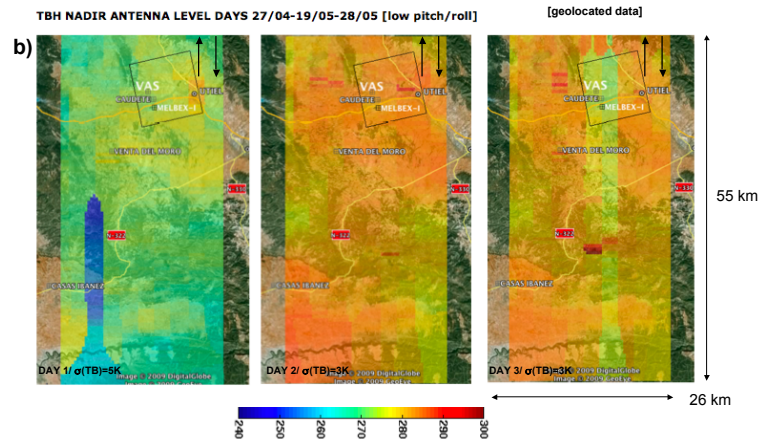
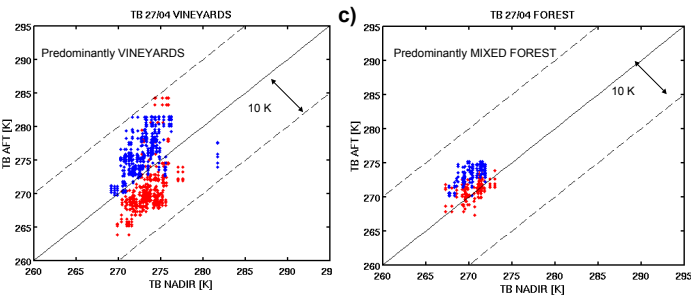
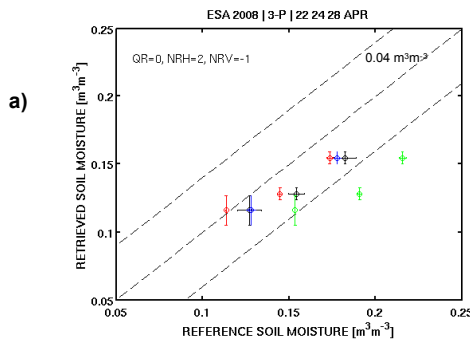


3. MICROWAVE-DERIVED SOIL MOISTURE

Soil moisture retrievals use L-band data at two angles and H, V polarisations + L-MEB modelling + detailed surface information (texture, land use). These data are used for the simulation of the brightness temperature (TB) vector $[TB_{x,\theta} \ TB_{y,\theta} \ TB_{x,\phi} \ TB_{y,\phi}]$ at the antenna level, where comparisons between modelled & measured TBs are performed for the retrieval of surface parameters.

ESA Rehearsal 2008: a) Retrievals of three parameters (3-P: SM, optical depth, roughness) from low-altitude flights over vineyards show good temporal correlation compared to average field SM (5 cm depth), **SURFEX SM (2 cm depth)**, **SURFEX SM (5 cm depth)**, and SM unit maps (5 cm).

CAROLS 2009: b) TB measurements at nadir over the whole area (day 1: dry, day 2: very dry, day 3: very dry); c) Forest vs vineyard distinct radiometric signature (H pol, V pol, AFT~ 38 deg angle).



d) Surface parameter retrievals from CAROLS 2009 data

2-P retrievals (SM, τ_{NAD})	Land use	H_R	Q_R	NR_H	NR_V	Retrieved SM [$m^3 m^{-3}$]	Field SM [$m^3 m^{-3}$]	Retrieved τ_{NAD}	STD Retrieved SM [$m^3 m^{-3}$]	RMSE (TB)
Dry day (1)	Shrubs	0.3	0.2	2	-1	0.15 (0.02)	0.11 (0.05)	0.30 (0.06)	0.003	1.3
	Vines	0.3	0.2	2	-1	0.11 (0.03)	-	0.23 (0.06)	0.002	1.7
	Open Forest	0.3	0.2	2	-1	0.20 (0.08)	-	0.34 (0.13)	0.045	2.0
Very dry day (3)	Shrubs	0.3	0.2	2	-1	0.03 (0.05)	0.06 (0.03)	0.13 (0.20)	0.002	2.1
	Vines	0.3	0.2	2	-1	0.04 (0.05)	-	0.22 (0.24)	0.002	1.3
	Open Forest	0.3	0.2	2	-1	0.06 (0.06)	-	0.24 (0.22)	0.003	2.3