Surface emissivity data from PORTOS-Avignon experiment. Appendix B

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The data displayed in the following table were collected at the INRA research Centre near Avignon (43°55'N, 4°53'E, south of France) in 1993. Emissivity values were estimated from the measurements made by the PORTOS radiometer (Chanzy et al. 1994). The atmospheric and sky contributions were removed from the brightness temperature measured by PORTOS by an algorithm described in Calvet et al., 1995. Atmospheric and sky contributions were estimated using the outputs of the Météo-France 15 levels weather forecast model PERIDOT and the cloud observations made at the experimental site along with the radiometric acquisitions. The surface effective temperature was estimated by the skin temperature measured by a thermal infrared radiometer. The expected error in microwave emissivities is +/- 0.015.

All the measurements were made on a silty clay loam soil (27% of Clay, 11% of Sand). For each surface type, a set of three moisture conditions (wet, medium wet and dry) were gathered in the table in order to give the range of emissivity variations due to the soil moisture. Measurements of the surface characteristics (soil moisture, surface roughness and vegetation) are given in the table for each set of microwave measurements (one line in the table) since measurements at all radiometric configurations were collected together.

The whole Avignon 93 database is available on a CD (Chanzy et al., 1999), which can be obtained upon request (contact : achanzy@avignon.inra.fr). The database includes a very large data set in terms of incidence, moisture, surface roughness, biomass and detailed ground truth data (detailed vegetation description, soil characteristics, water balance for the wheat surface, climatic measurements).

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Emissivity measurements collected over agricultural surfaces with bare soil and vegetation covers at $\theta = 40°$

Veg. Type	Veg. water content (kg/m^2)	Surface observation	HRMS (mm)	Correl. length (mm)	Soil wat. content (0-5mm) (m^3/m^3)	Emiss. 1.4 GHz H-pol	Emiss. 1.4 GHz V-pol	Emiss. 5.05 GHz H-pol	Emiss. 5.05 GHz V-pol	Emiss. 10.65 GHz H-pol	Emiss. 10.65 GHz V-pol	Emiss. 23.8 GHz H-pol	Emiss. 23.8 GHz V-pol	Emiss. 36.5 GHz H-pol	Emiss. 36.5 GHz V-pol	Emiss. 90 GHz H-pol	Emiss. 90 GHz V-pol
Bare	0	Very rough	60	72	0.247	0.83	0.91	0.80	0.84	0.82	0.84	0.84	0.87	0.89	0.91	0.89	0.90
Bare	0	Very rough	60	72	0.117	0.86	-	0.86	0.88	0.87	0.89	0.89	-	0.93	0.95	0.93	0.93
Bare	0	Very rough	60	72	0.011	0.91	0.95	0.90	0.92	0.92	0.93	0.94	0.95	0.96	0.97	0.95	0.96
Bare	0	Rough	19	66	0.311	0.75	0.88	0.79	0.86	0.82	0.85	0.83	0.85	0.83	0.84	0.89	0.90
Bare	0	Rough	19	66	0.132	0.82	0.93	0.83	0.90	0.86	0.89	0.87	0.89	0.86	0.88	0.91	0.93
Bare	0	Rough	19	66	0.014	0.90	0.95	0.93	0.95	0.90	0.94	0.93	0.94	0.94	0.96	0.95	0.96
Bare	0	Smooth	8	31	0.364	0.56	0.70	0.74	0.78	0.76	0.82	0.77	0.83	0.76	0.84	0.81	0.85
Bare	0	Smooth	8	31	0.189	0.75	-	-	0.85	-	0.85	-	0.86	-	0.89	0.85	0.91
Bare	0	Smooth	8	31	0.065	0.80	0.91	0.86	0.94	0.89	0.94	0.89	0.94	0.91	0.96	0.89	0.94
Bare	0	Very smooth	5	206	0.365	0.51	0.74	0.51	0.71	0.55	0.72	0.54	0.73	0.57	-	0.65	0.83
Bare	0	Very smooth	5	206	0.127	0.70	0.82	0.72	0.87	0.76	0.89	0.75	0.89	0.78	0.94	0.81	0.92
Bare	0	Very smooth	5	206	0.021	0.85	0.96	0.85	0.96	0.89	0.96	0.92	0.97	0.93	0.98	0.92	0.95
Wheat	1.9	green veg.	6	93	0.314	0.74	0.92	0.92	0.95	0.95	0.96	0.95	0.96	0.97	0.98	0.95	0.96
Wheat	2.6	green veg.	6	93	0.240	0.80	0.95	0.94	0.94	0.95	0.96	0.95	0.96	0.96	0.96	0.92	0.93
Wheat	2.6	green veg.	6	93	0.152	0.83	0.99	0.95	0.95	0.97	0.97	0.97	0.97	0.98	0.97	0.96	0.97
Wheat	1.2	Senescent	6	93	0.031	0.74	-	0.88	0.92	0.95	0.98	0.96	0.97	0.97	0.97	0.98	0.99
Wheat	1.1	Senescent	6	93	0.315	0.63	0.87	0.86	0.92	0.96	0.98	0.96	0.97	0.97	0.97	0.99	0.99
Wheat	1.1	Senescent	6	93	0.200	0.65	0.88	0.85	0.92	0.95	0.97	0.95	0.96	0.95	0.96	0.97	0.98
Sorgho	0.23	Sparse veg.	5	63	0.203	0.68	0.85	0.71	0.79	0.73	0.81	0.73	0.83	0.72	0.87	0.78	0.88
Sorgho	0.29	Sparse veg.	5	63	0.059	0.78	0.93	0.84	0.91	0.87	0.94	0.91	0.96	0.87	0.95	0.89	0.97
Sorgho	0.61	Sparse veg.	6	76	0.25	0.70	-	0.78	0.82	0.82	0.87	0.84	0.88	0.83	0.91	0.86	0.89
Sorgho	0.77	Sparse veg.	6	76	0.07	0.82	0.93	0.90	0.92	0.91	0.94	0.92	0.93	0.90	0.94	0.90	0.93

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