

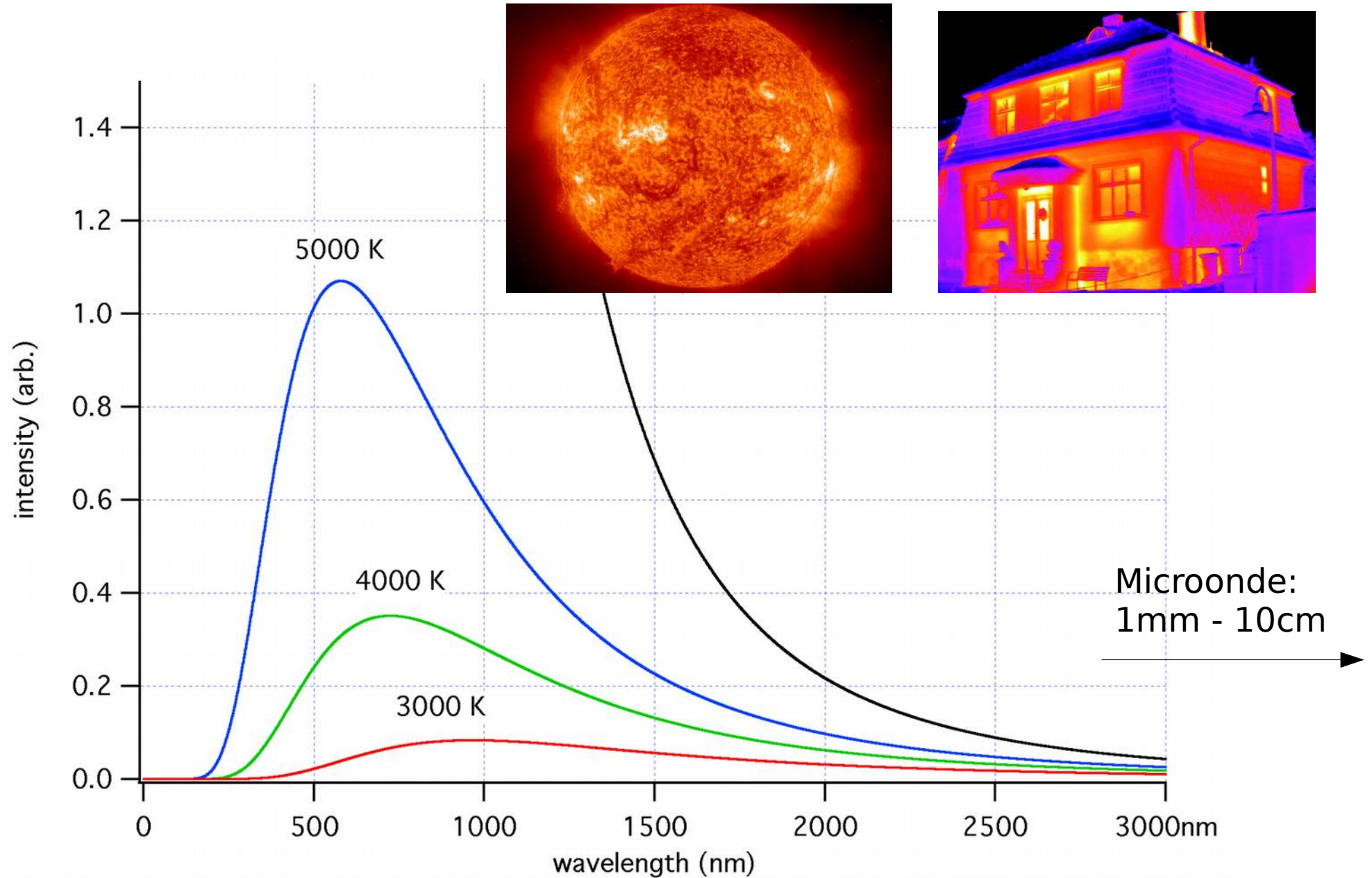
Détection de la neige humide par télédétection micro-onde passive

Ghislain Picard



Radiométrie micro-onde

Black body radiation



Radiométrie micro-onde



SMMR, SSM/I, AMSR

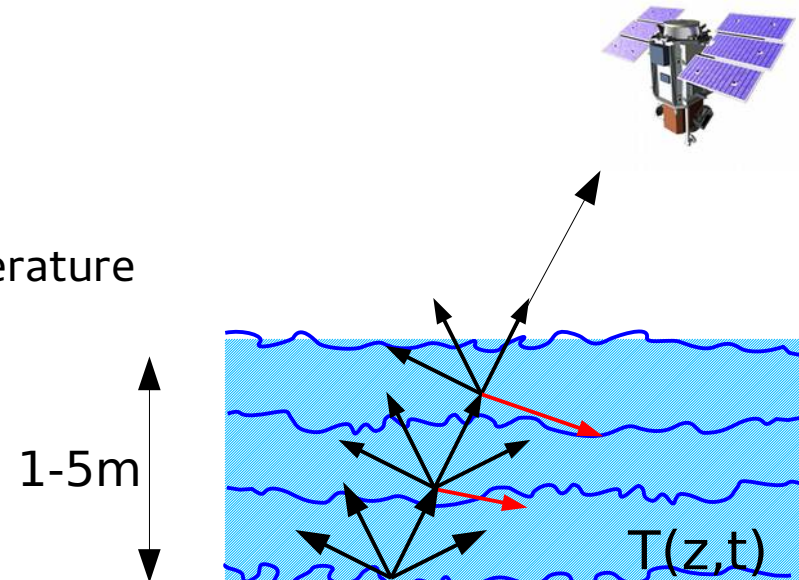
Quasi-continuous time-series from 1979

Dry snow is a **gray body** and is partially **transparent** in the microwave.

$$T_b = \epsilon T_s$$

Satellite obs Emissivity Temperature

$$\epsilon = 0.65 - 0.8$$



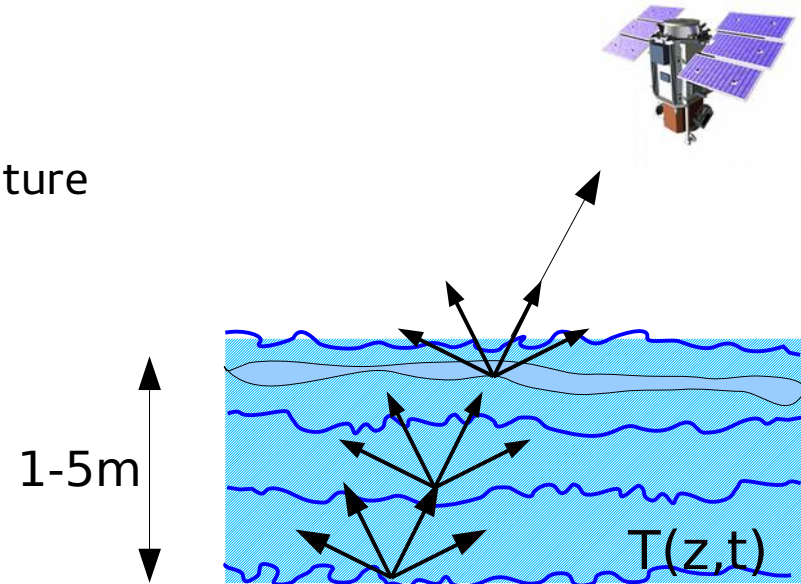
Radiométrie micro-onde

Liquid water is a very strong absorber in the microwave domain → black body

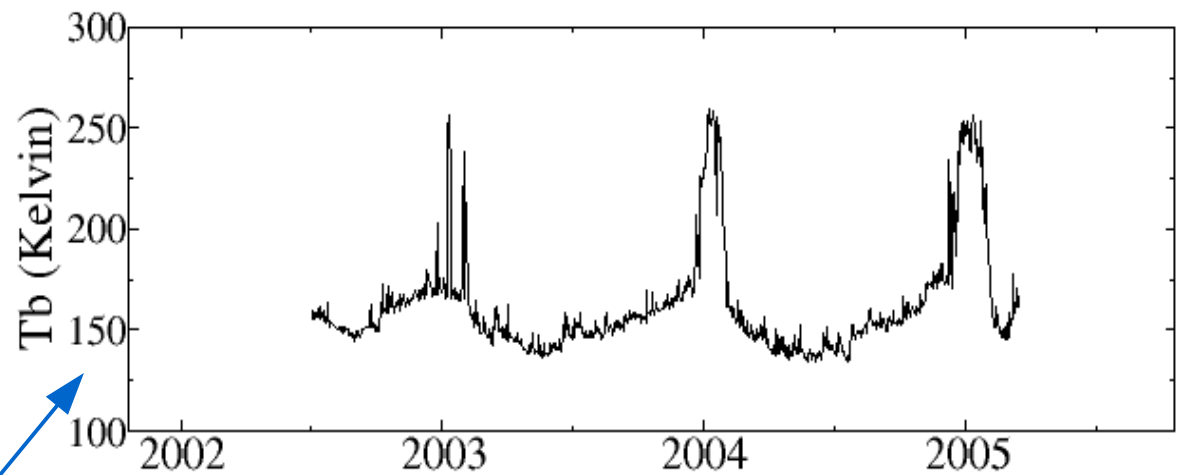
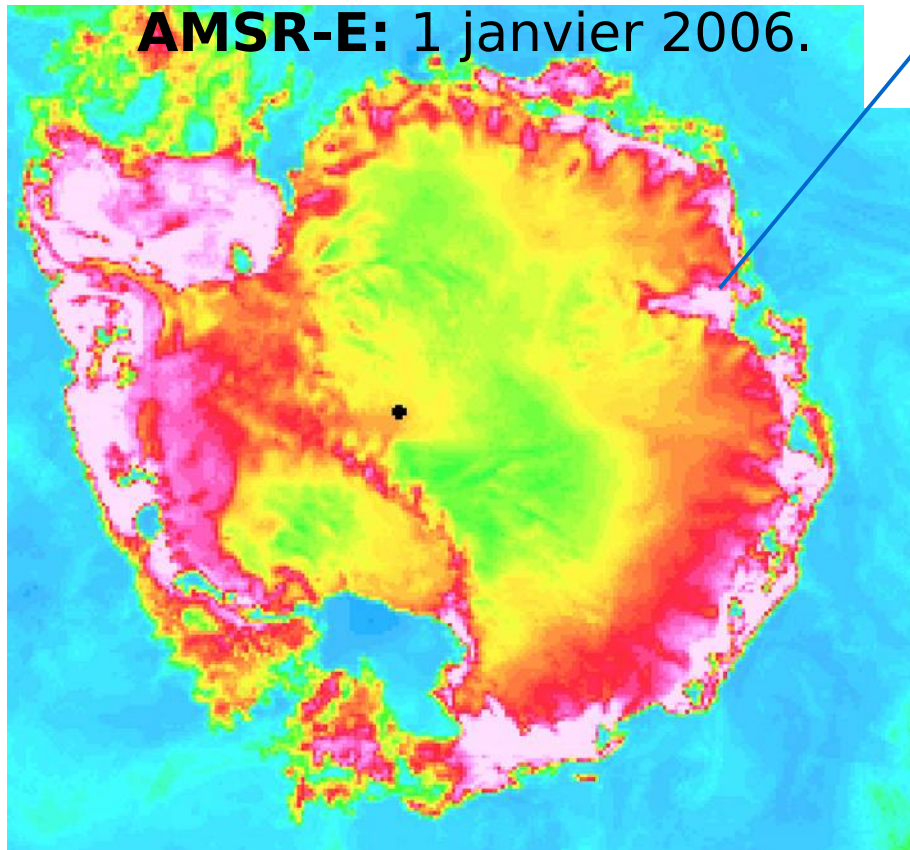
$$T_b = \epsilon T_s$$

Satellite obs Emissivity Temperature

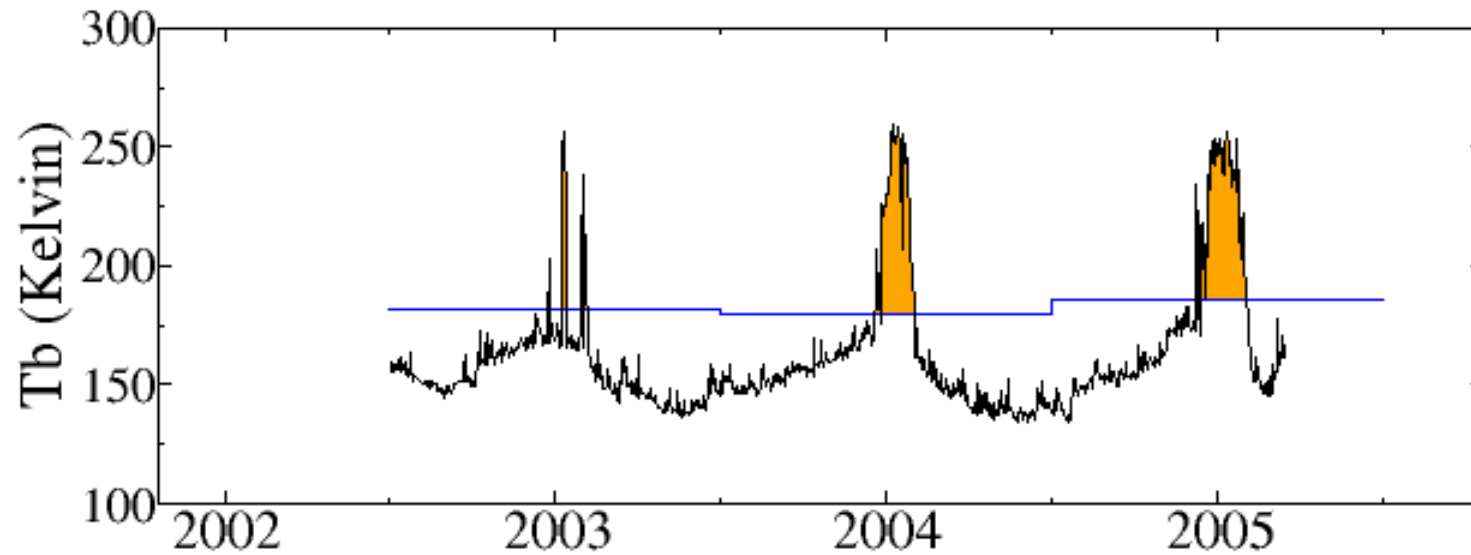
$$\epsilon = 0.9 \text{ or more}$$
$$T_s = 273 \text{ K}$$



Principe physique

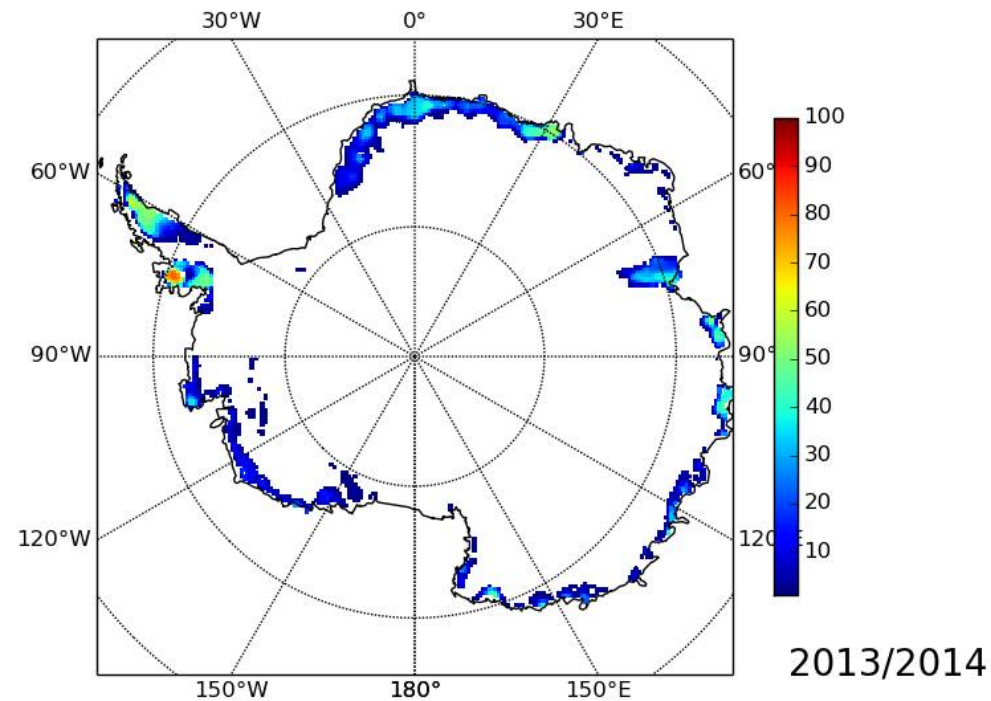


Algorithme

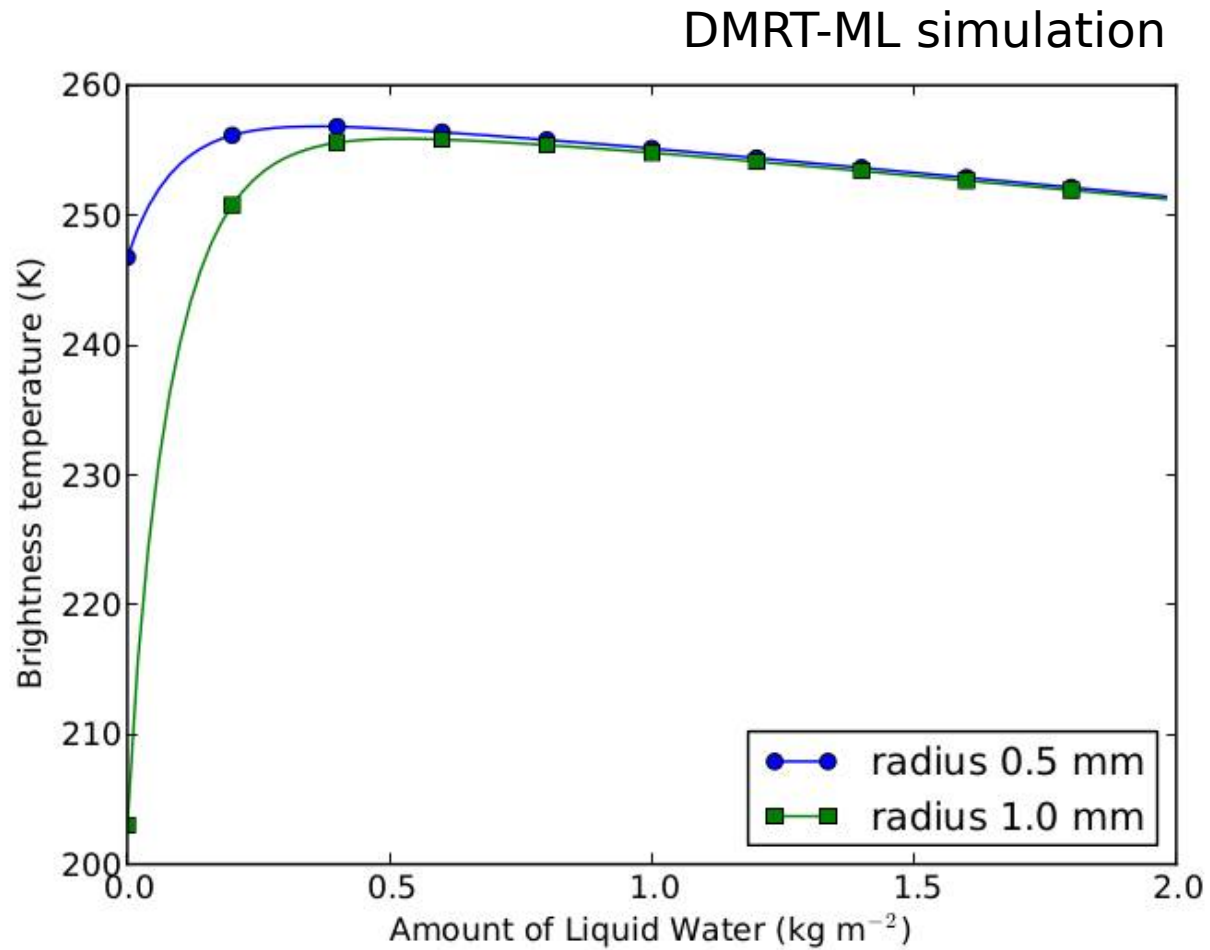


LGGE's algorithm by: Torinesi et al. 2003
Picard et Fily, 2006, Picard et al. 2007

The daily dataset (1979-present) is available
from: <http://lgge.osug.fr/~picard/melting/>



Modélisation



At 19 GHz → very high sensitivity to LWC → impossible to measure water quantity

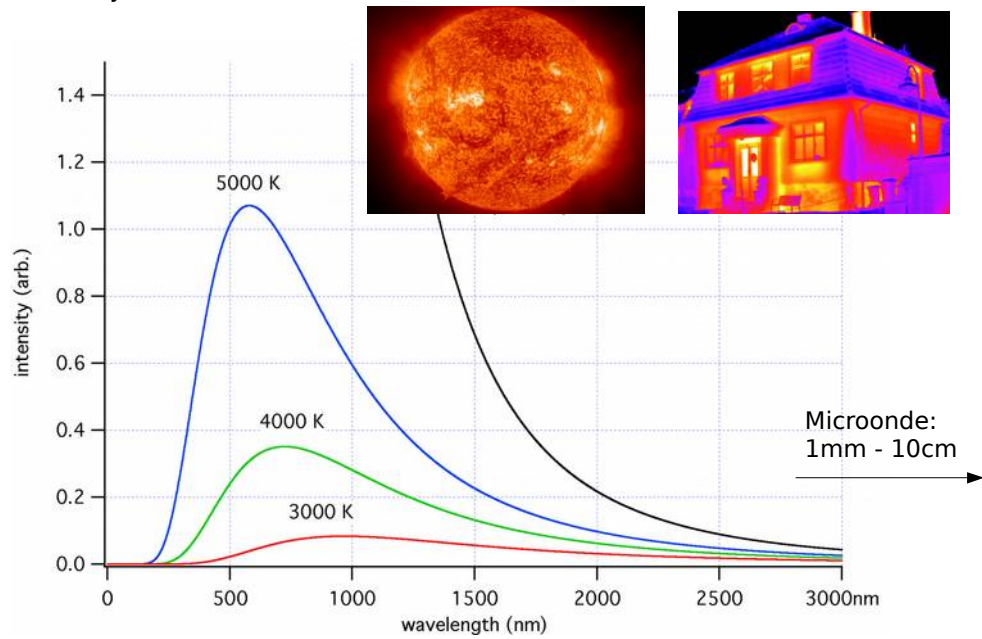
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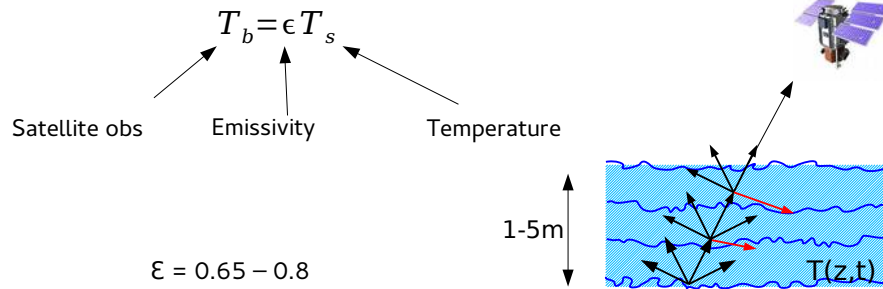
Radiométrie micro-onde



SMMR, SSM/I, AMSR

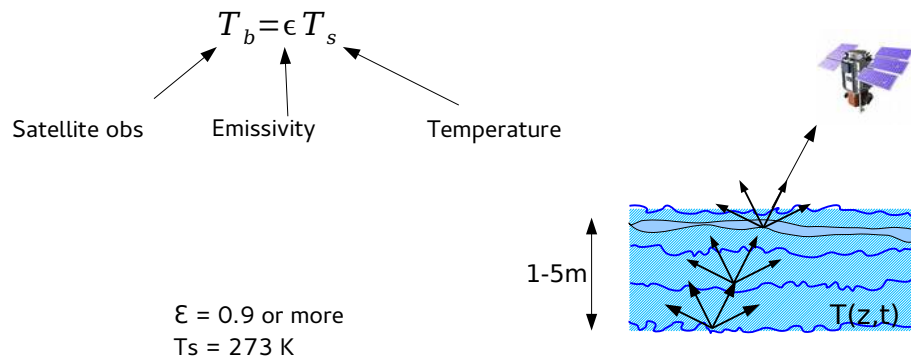
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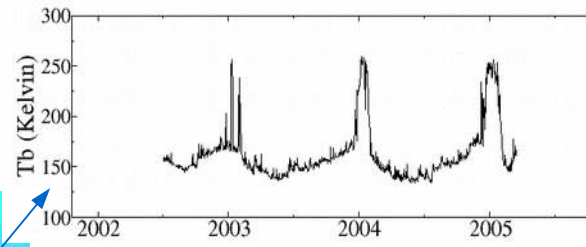
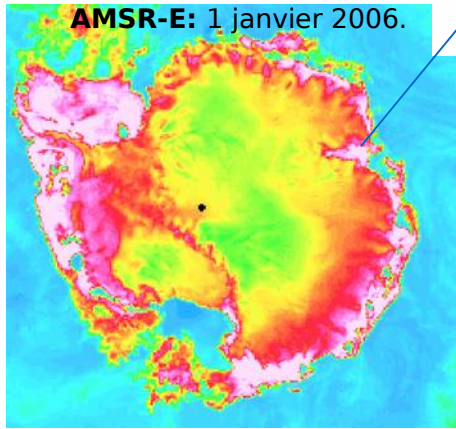


Radiométrie micro-onde

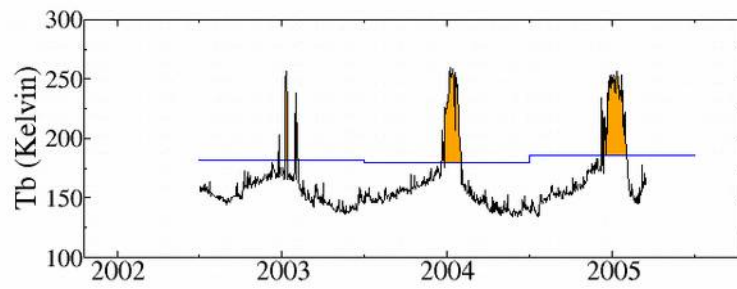
Liquid water is a very strong absorber in the microwave domain → black body



Principe physique

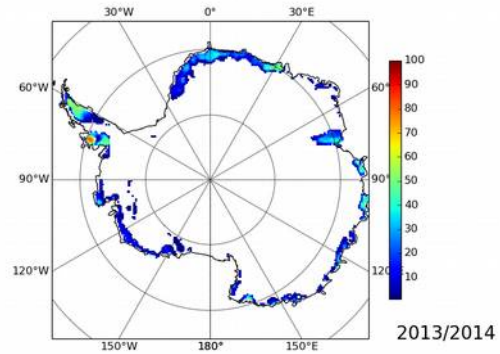


Algorithm

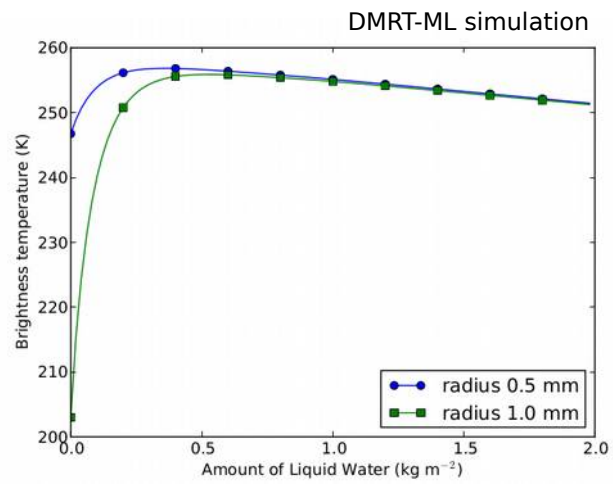


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