

Détection de la neige humide par télédétection micro-onde passive

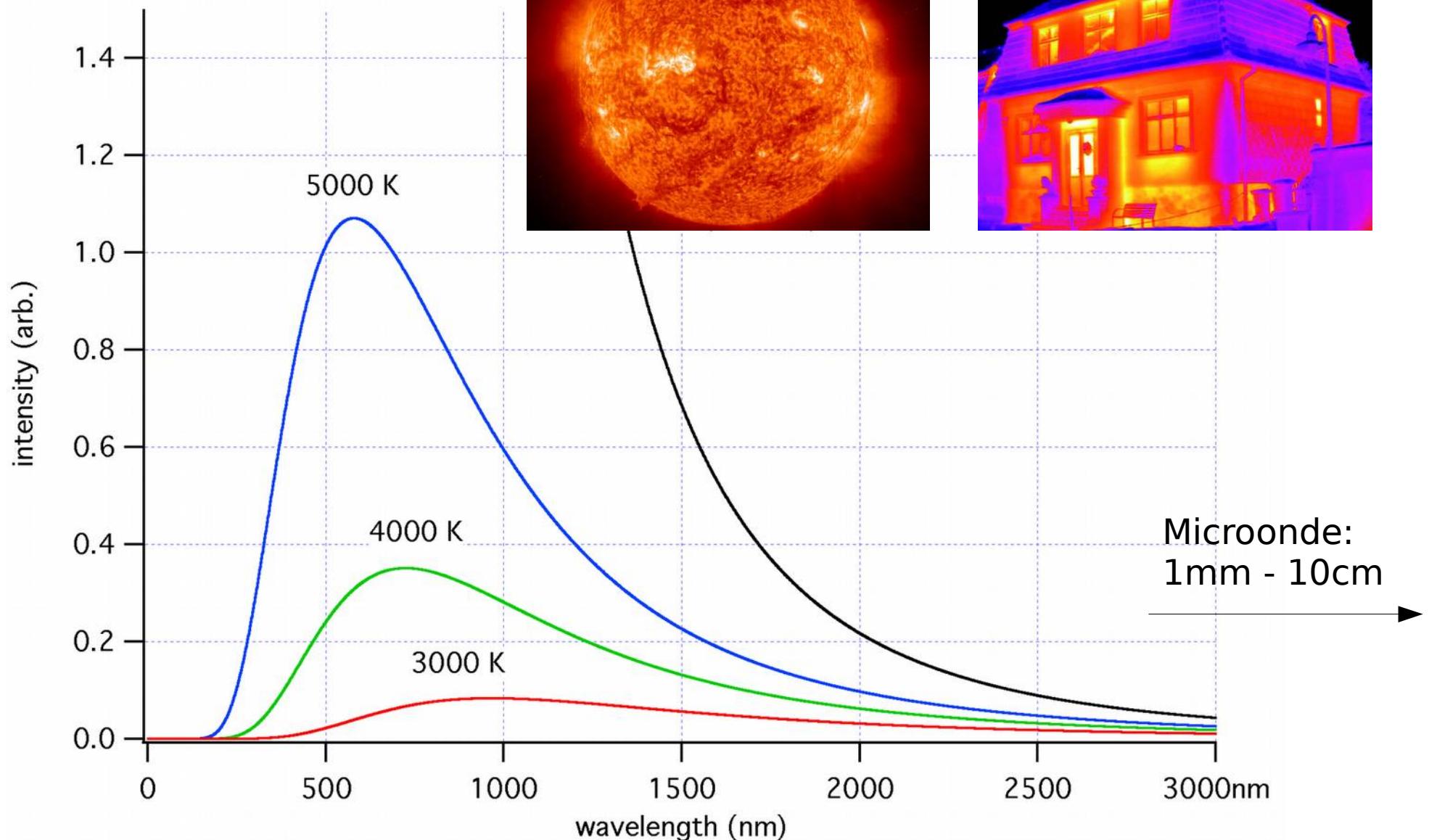
Ghislain Picard



Laboratoire de Glaciologie et Géophysique de l'Environnement

Radiométrie micro-onde

Black body radiation



Radiométrie micro-onde



SMMR, SSM/I, AMSR

Quasi-continuous time-series from 1979

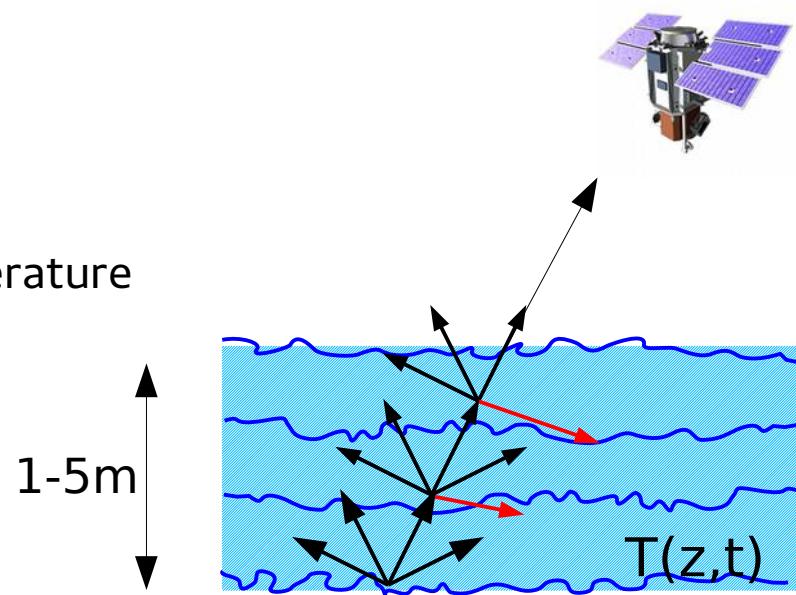
Dry snow is a **gray body** and is partially **transparent** in the microwave.

$$T_b = \epsilon T_s$$

Satellite obs Emissivity Temperature

$\epsilon = 0.65 - 0.8$

A diagram illustrating the relationship between satellite observations, emissivity, and temperature. The equation $T_b = \epsilon T_s$ is at the top, with three arrows pointing down to the labels "Satellite obs", "Emissivity", and "Temperature". Below the equation, the symbol ϵ is followed by the range "0.65 – 0.8".



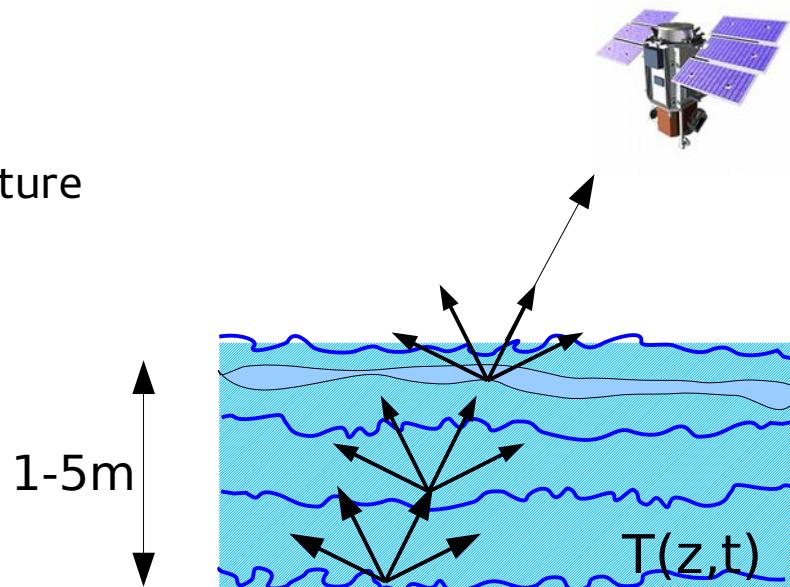
Radiométrie micro-onde

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

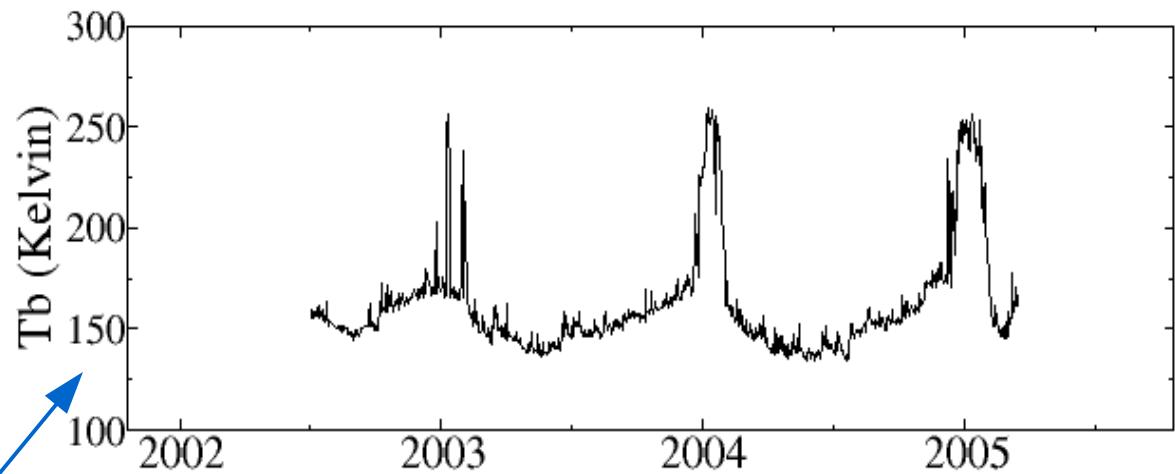
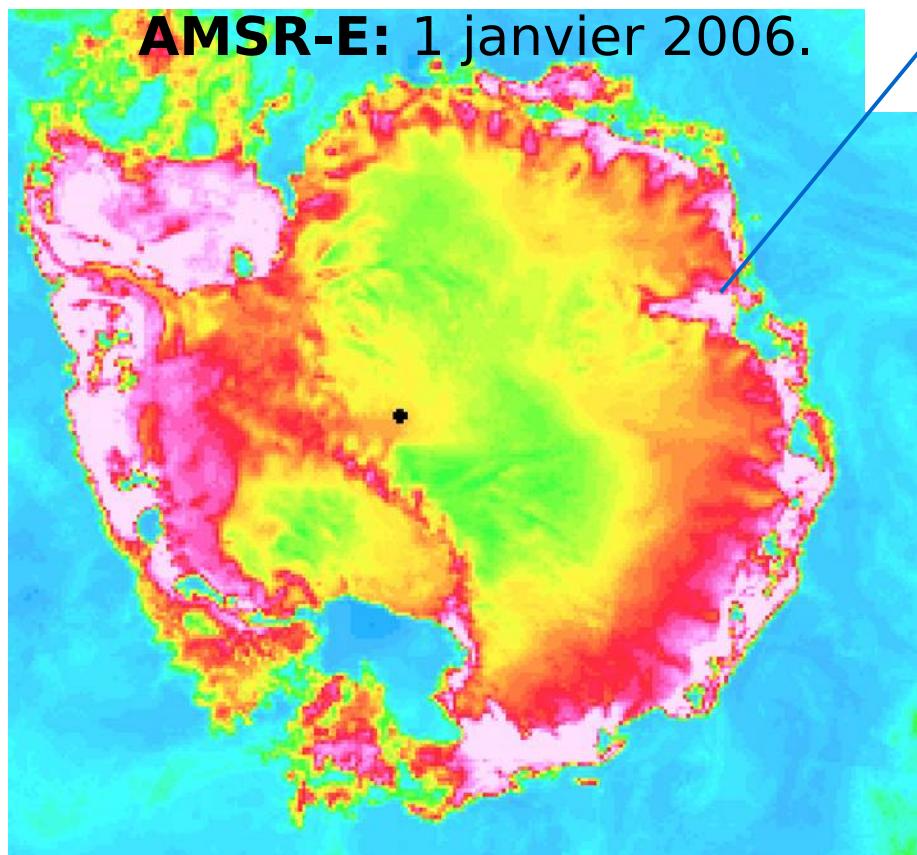
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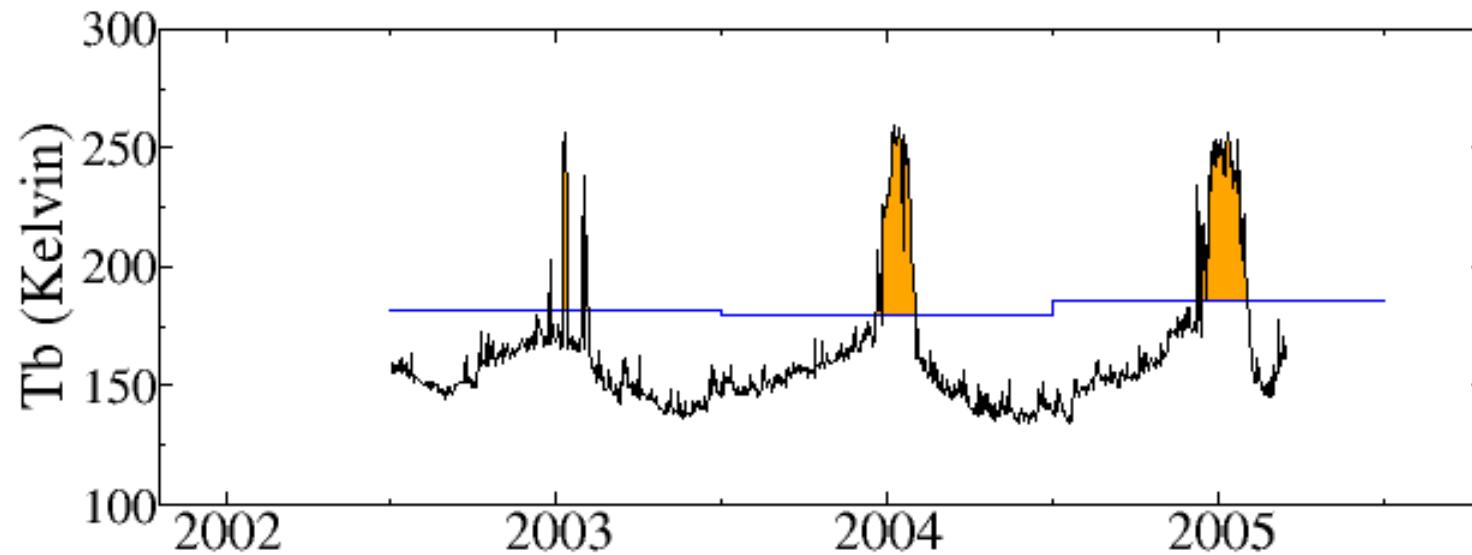
$$\begin{aligned}\epsilon &= 0.9 \text{ or more} \\ T_s &= 273 \text{ K}\end{aligned}$$



Principe physique

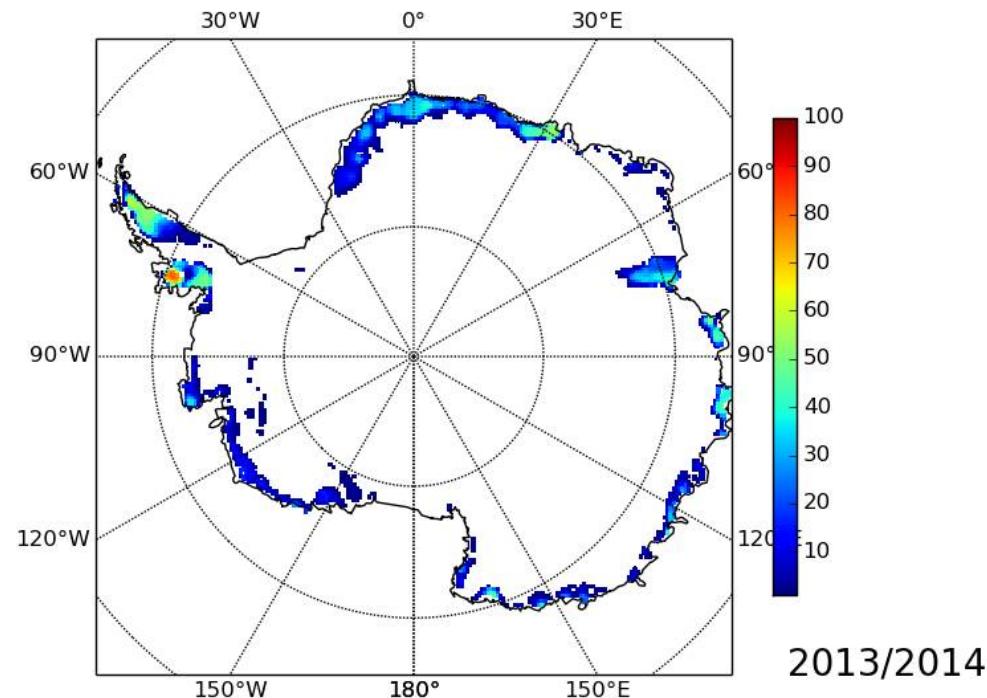


Algorithmme

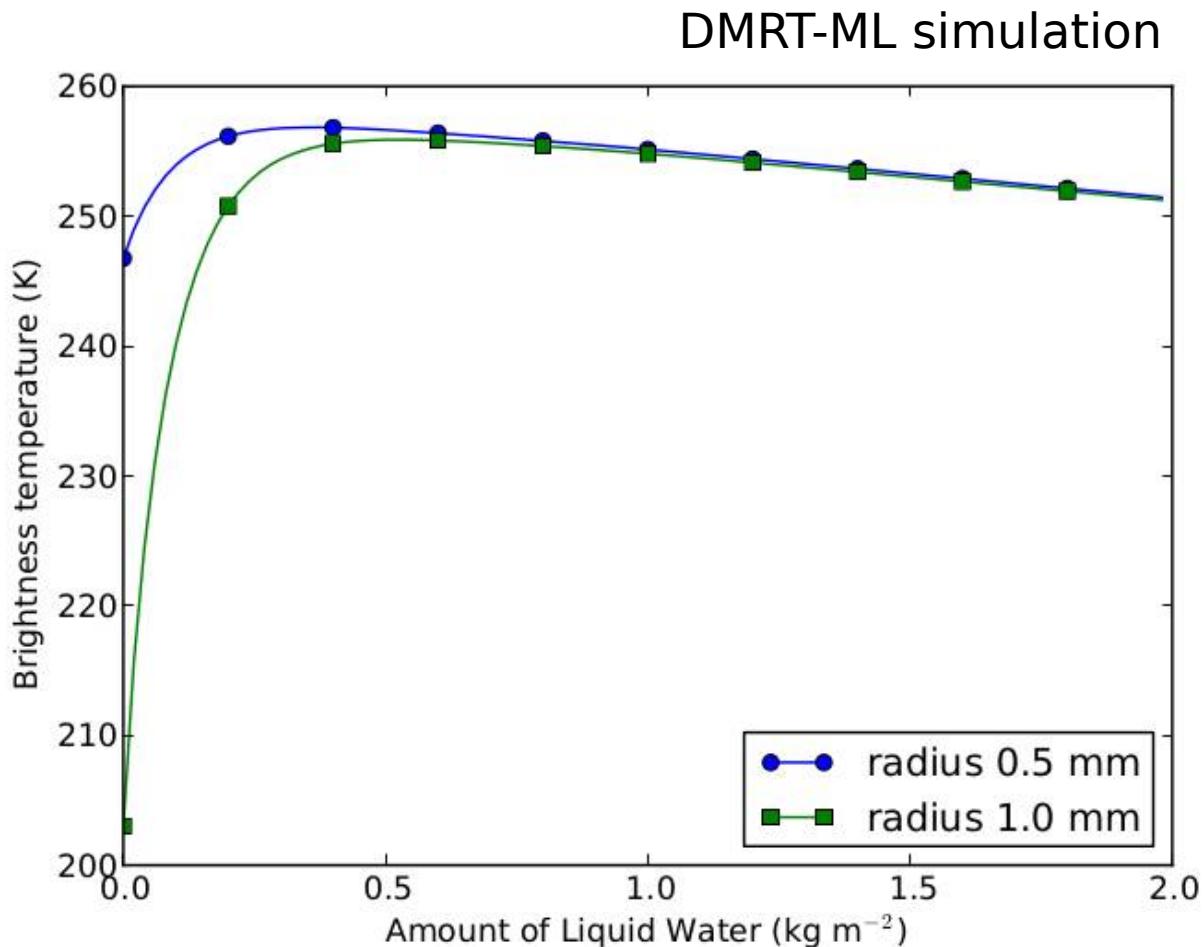


LGGE's algorithm by: Torinesi et al. 2003
Picard et Fily, 2006, Picard et al. 2007

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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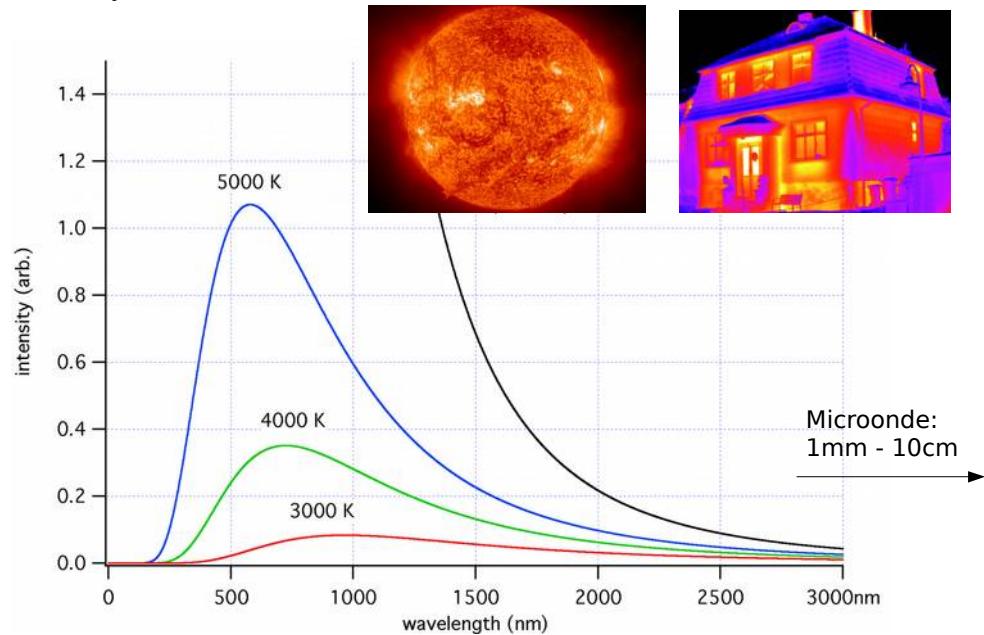
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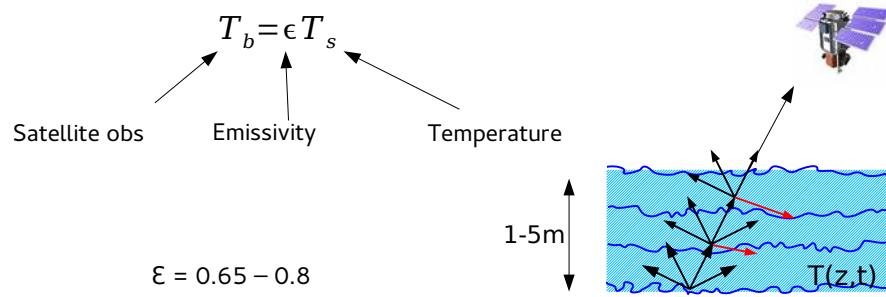
Radiométrie micro-onde



SMMR, SSM/I, AMSR

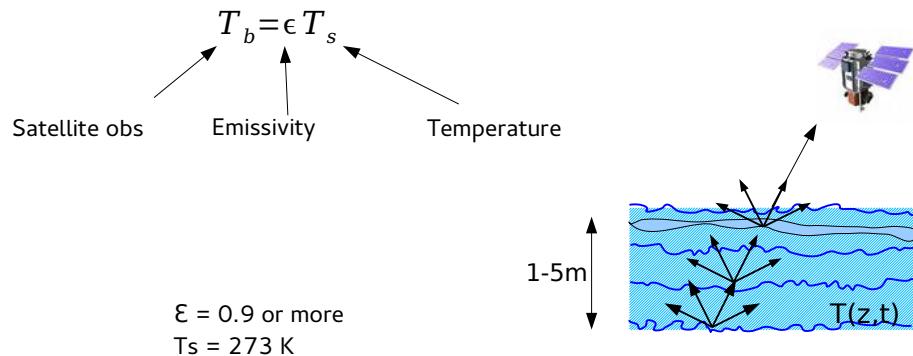
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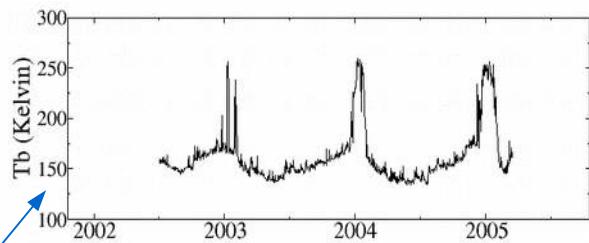
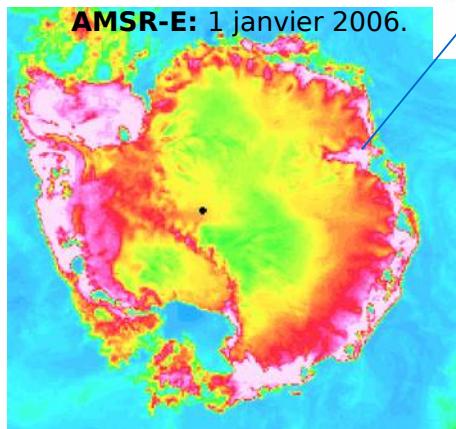


Radiométrie micro-onde

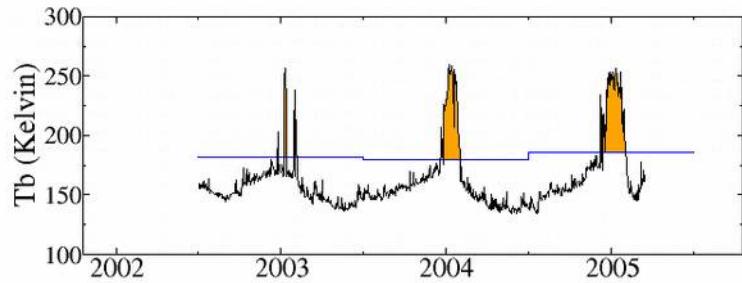
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Principe physique

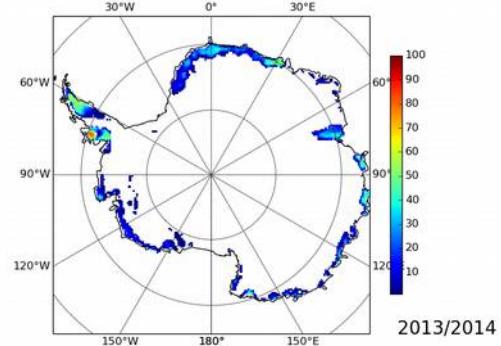


Algorithmme

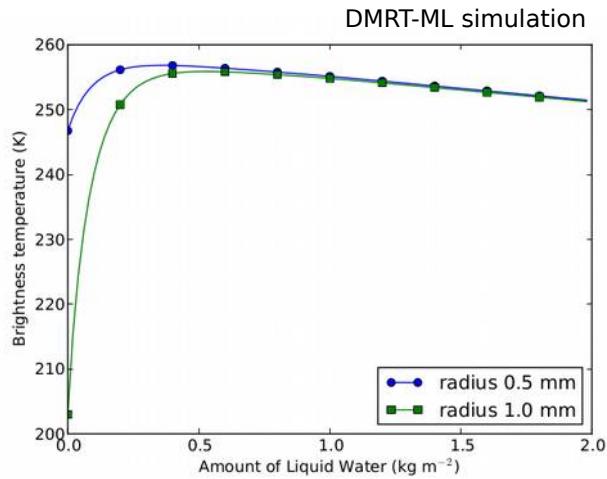


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