SMOS in Poland

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Overview

- SMOS Test Sites in Poland
- Dealing with RFI in Poland
- SMOS L2 data in comparison with ground-based measurements; SMOS L1c data - basic attempts in retrieving SM
- Conclusions and Summary

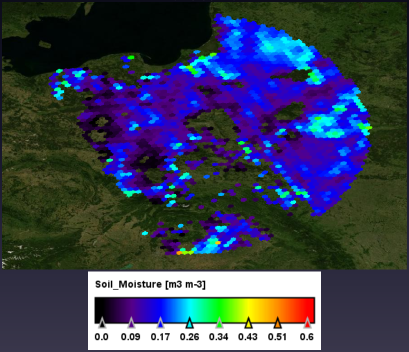
SMOS in Poland

On the purpose of SMOS Cal/Val activities, the **SWEX (Soil Water and Energy eXchange)** project is conducted in Poland. SWEX gathers several institutes, that conduct ground based measurements in the selected Cal/Val sites. The ground based stations create a sparse grid, spread in the circle area of radius 500 km.

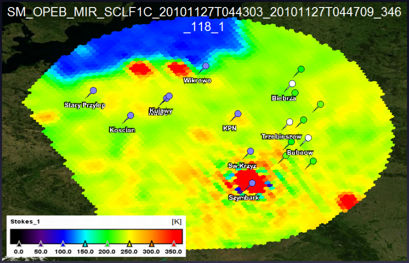
Major interest is devoted to Biebrza wetland (*DGG:3012239*), which belongs to the group of the largest wetland ecosystems in Europe. It is confronted with other test sites, like swampy areas of Podlasie (*DGG:3009153*) and Polesie (*DGG:3009659*).

Mission objective

Main goal of the mission is to provide permanent monitoring of soil moisture...



however retrieval process of geophysical parameters is strongly affected by RFI sources.

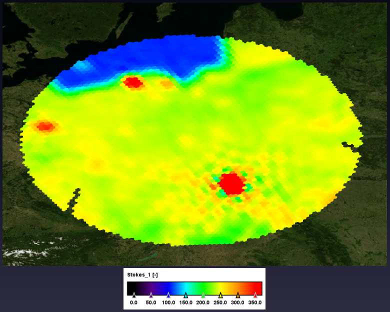


Data set

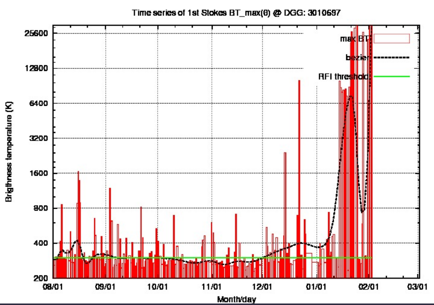
- SMOS L1c data, full polarization mode. Selection of orbits covering central part of the FOV (the so-called Narrow Swath - possibly the widest range of incidence angles ($10^\circ \div 65\ ^\circ$)). Time period: 14.07.2010 - 31.01.2011
- SMOS L2 products: SM
- Ground data: Soil moisture measurements from the ground stations (measured at depth: 5cm up to 40cm)
- Air temperature - meteo stations, precipitation - ground based meteorological radars.
- Additionally soon planed field campaigns will involve LAI, TDR measurements and validation campaign with ELBARA radiometer.

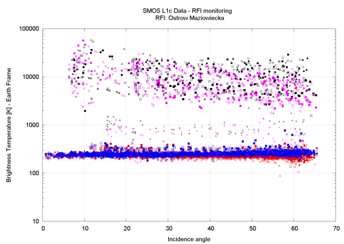
Dealing with RFI

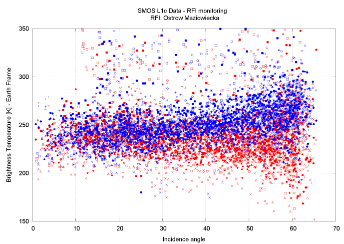
- Due to high contamination caused by RFI accurate retrieval process is significantly disturbed.
- To obtain quantitative description, two steps are proposed: perform **statistical analysis and angular dependency analysis** of identified RFI sources.



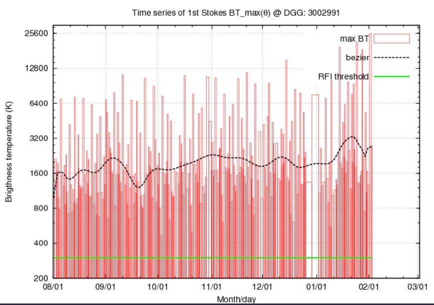
RFI - Ostrow Mazowiecka



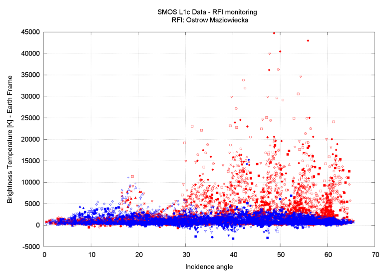




RFI - Debica

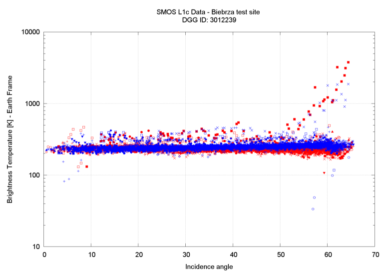


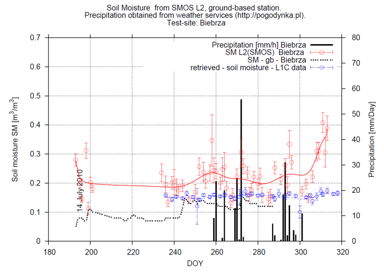
Time series of 1st Stokes BT_max(θ) @ DGG: 3002991
max BT
bezier
RFI threshold
Brigthness temperature (K)
25600
12800
6400
3200
1600
800
400
200
08/01
09/01
10/01
11/01
12/01
01/01
02/01
03/01
Month/day



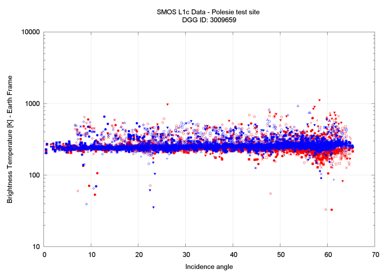
SMOS L1c Data - RFI monitoring
RFI: Ostrow Maziowiecka
Brightness Temperature [K] - Earth Frame
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
-5000
0
10
20
30
40
50
60
70
Incidence angle

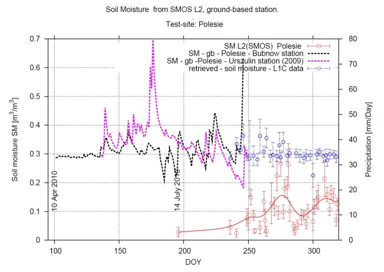
Test sites - Biebrza



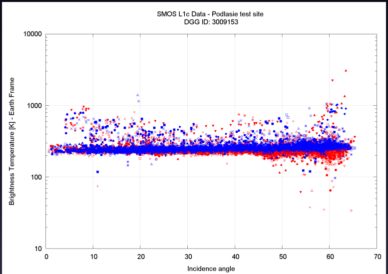


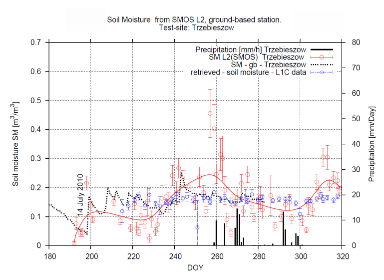
Test sites - Polesie



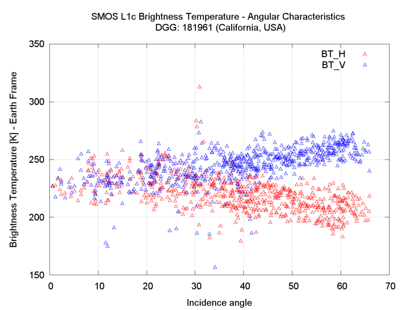


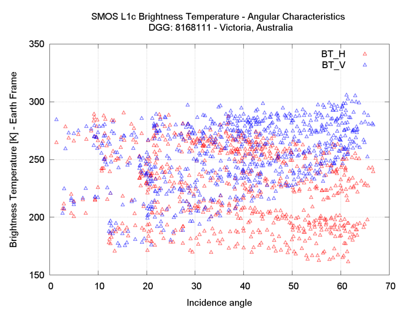
Test sites - Polesie





“Good pixels” vs. “Bad pixels” - General overview





Summary

- Main goal of the mission is to provide permanent monitoring of soil moisture, however retrieval process of geophysical parameters is strongly affected by RFI sources.
- Successful validation and SM retrieval from SMOS demands controlling of the disturbing contribution from RFI.
- Open question: Is it possible to extract information on RFI only from SMOS L1c data? Maybe SMOS L1a, L1b is more relevant? RFI mitigation performed at lower level data - Camps et al. "RFI analysis in SMOS Imaginary "
- Perform more advanced analysis with SMOS Level 1 Processor Prototype (SMOS L1PP).
- Relevancy of the ground data to the areal estimations can be supported by the land cover modeling, but monitoring of fundamentally important physical parameters on soils and evolution of vegetation canopy is crucial in proper validation.