

Inter-Calibration Working Group

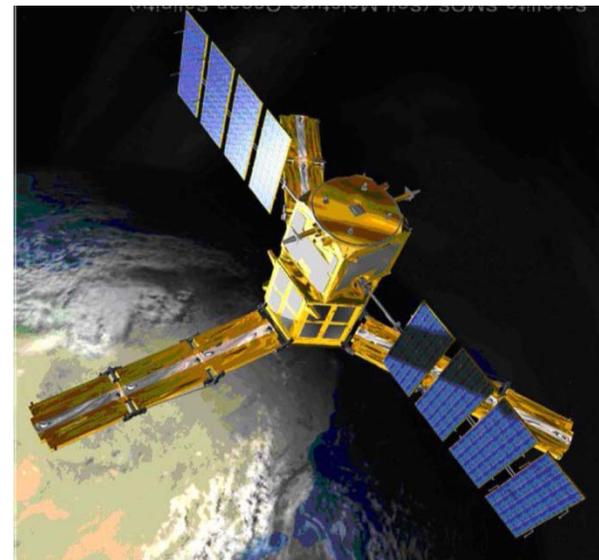
David Le Vine

Aquarius Deputy PI

NASA/Goddard Space Flight Center

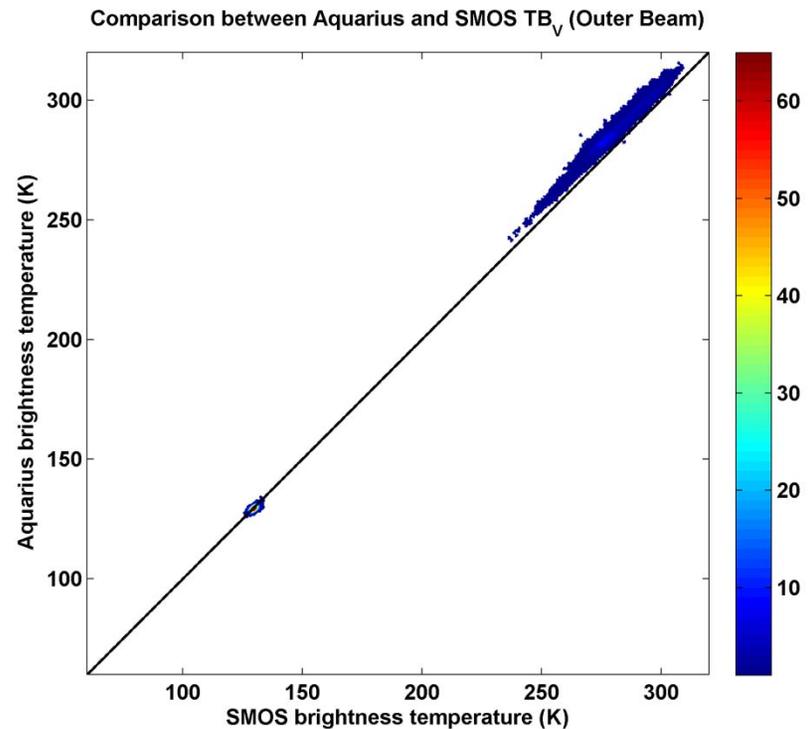
Introduction

- **Inter-calibration**
 - Tool for the success of each mission
 - Important quality check on the science product
- **Common Challenges**
 - Geophysical model
 - Galactic background radiation
 - Model for surface emissivity
 - Roughness (waves)
 - dielectric constant model function
 - Absolute calibration: Reference sites
 - Cold Sky
 - Dome-C
 - Land / Ocean
 - Instrument issues
 - Asc/Dsc bias
 - Third Stokes calibration
 - RFI
- **Working Group**
 - Develop a plan forward
 - Identify issues



Inter-Cal Working Group

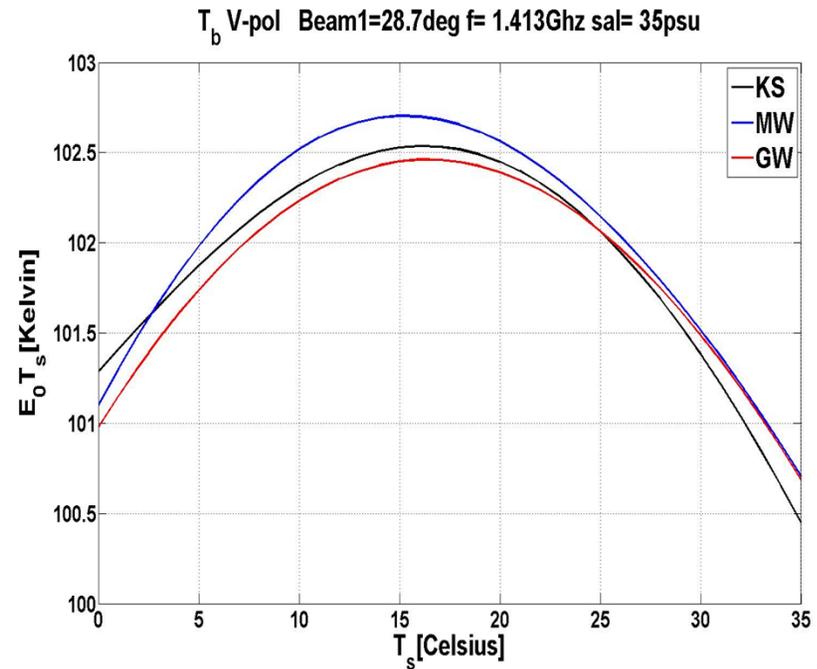
- **Time is Right**
 - Both instruments healthy
 - Aquarius + SMOS: 1.5 years of overlap
- **The Work has Begun**
 - Direct Comparison of SMOS & Aquarius retrievals
 - Land and ocean
 - Relative SSS accuracy
 - Common reference sites
 - Ice (DOME-C)
 - Geophysical phenomena
 - Dielectric constant of sea water
 - Roughness/Wind speed
 - Instrument performance
 - SMOS NIR and Aquarius real aperture antenna
 - Asc/Dsc differences
 - Third Stokes



R. Bindlish, "Intercomparison of Aquarius and SMOS Brightness Temperatures"

The Inter-Cal Working Group

- **Working Group**
 - Objective:
 - Develop path to inter-calibration
 - Identify common issues
 - Co-Chair: Kerr, Font, Lagerloef, Le Vine
 - Inaugural Meeting (Tuesday PM)
 - Identify Path forward
 - Identify sub-groups
- **Inter-calibration Issues**
 - Geophysical models
 - Roughness model
 - Permittivity model
 - Ancillary data
 - NCEP vs ECMWF
 - Faraday rotation
 - What to Compare
 - Brightness temperature
 - Retrieved science: SSS and/or SM
 - Absolute Calibration: Reference sites
 - Cold sky
 - Dome-C
 - Land ????
 - Other ???



R. Lang et al. "Improved GW Model Function Based on Additional Seawater Measurements"

Working Group Charter

- Salinity inter-calibration: This working group aims toward a merged and validated data product. Initial work will concentrate on solving several key common geophysical modelling issues related to galaxy, roughness, emissivity, ascending-descending biases, RFI, etc., as well as direct inter-calibration of brightness temperatures and salinity products. Given the diverse set of issues there might be a need to set up further sub-groups (for example for specific land or ocean points). Initial work might concentrate on ascending-descending biases and RFI issues. A potential aim for the workshop for this working group would be to present some findings and recommendations for adopting certain models or methods, and for follow-on work.
- **Working group chairs: Gary Lagerloef (ESR), David LeVine (NASA), Yann Kerr (CESBIO), Jordi Font (ICM/CSIC)**

Inter-Calibration

Issues

- Geophysical models
 - Roughness model
 - Permittivity model
- Ancillary data
 - NCEP vs ECMWF
 - Faraday rotation
- What to Compare
 - Brightness temperature
 - Retrieved science: SSS and/or SM
- Absolute Calibration: Common reference sites
 - Cold sky
 - Dome-C
 - Land ?????
- Other ???

Challenges

- Different technology
 - SMOS: Interferometer (synthetic aperture radiometer)
 - Aquarius: traditional radiometer (pushbroom)
- Different retrieval algorithms
 - Approach
 - SMOS: multi-angle optimization
 - Aquarius: direct inverse
 - Geophysical model function
 - dielectric constant for ocean (& land?)
 - Roughness correction
 - Ancillary data
 - ECMWF
 - NCEP
- Absolute Calibration
 - SMOS: Cold sky and FTT + OTT for ocean
 - Aquarius: HYCOM Ocean model
- Other
 - Asc/Dsc out of phase (limited overlap)
 - Viewing angles & spatial resolution

Inter-Calibration

Approach

- Compare retrievals
 - Soil moisture/sea surface salinity
 - Cold sky (correct model)
- Share reference sites
 - Land
 - Ice (DOME-C)
 - Ocean ???
- Geophysical phenomena
 - Compare RFI maps
 - Compare Faraday rotation estimates
 - Roughness maps
- Check instrument performance
 - SMOS NIR and Aquarius real aperture antenna
 - Asc/Dsc differences
 - Galactic background and effect of roughness