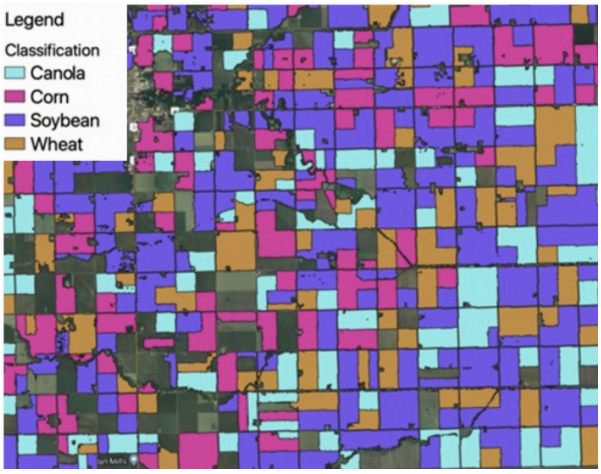
ICGS-SAR
INTERNATIONAL COORDINATION GROUP FOR SPACEBORNE SAR MISSIONS

Thematic Area 1: Polarimetric and Multi-frequency SAR Applications

Thematic Area 1 (TA-1) covers applications such as forestry, agriculture, wetland and other land uses (i.e. the IPCC "AFOLU" themes), plus others relating to ocean and sea ice. The group focuses on polarimetric and multi-frequency SAR applications, with the main measurements being polarimetric or multi-frequency backscatter intensity and/or polarimetric phase. InSAR is often cited as useful, but is not the main driver.

TA-1 Leads:

- Ake Rosenqvist (JAXA)
- Magdalena Fitrzyk (ESA)



Early season crop classification, using RADARSAT-2 and TerraSAR-X (90% accuracy), provided by H. McNairn

Formed for the second workshop hosted by ESA in 2022, TA-1 covers three primary themes: forest, wetlands & biomass; agriculture & soli moisture; and ocean & sea ice. The ESA workshop saw presentations and discussions on each of these topics, resulting in a series of cross-cutting recommendations. The presentations included:

- Virtual Constellations to Monitor Agriculture, by Dr. Heather McNairn of Agriculture and Agri-Food Canada
- Forest, Wetlands & Biomass, by Maurizio Santoro of Gamma Remote Sensing
- Sea Ice & Ocean, by Malin Johansson & Wolfgang Dierking of UiT, The Arctic University of Norway

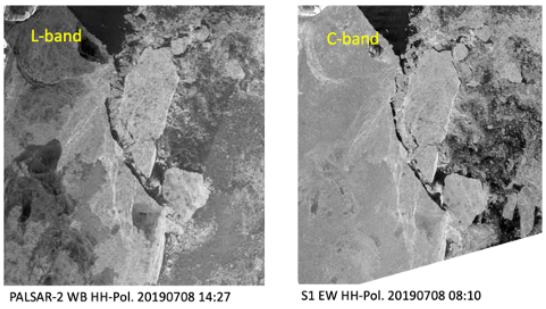
The summary presentation can be found here. Recommendations include the following:

Foster Operational Applications

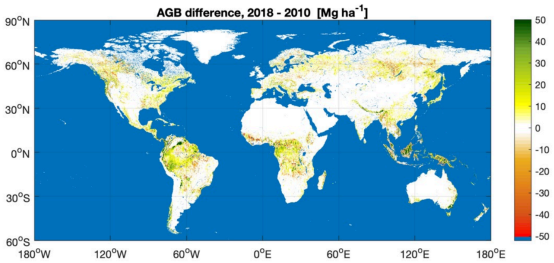
1. High potential of Full-Pol and Multifrequency data that today is still under-explored.
2. Continuity (sensor characteristics) and Homogeneity (in global coverage) are critically important for operational applications. Be boring rather than innovative.
3. Free and openly accessible products stimulate applications (preferably standardised ARD products).
4. For dynamic processes (agriculture, sea ice, ...) acquire multifrequency data temporally coincident.

Foster Research and Development

1. Conduct coordinated tower and airborne campaigns collecting multi-frequency and multi-[illegible] studies into the information content of multidimensional SAR data.
2. Define core sites (boreal, agriculture, wetland, ice,…) where Agencies AND Commercial providers systematically collect SAR data and make those data openly available.
3. Support the development of Open Source toolboxes for advanced SAR processing both optimised for “operational” applications (e.g. SNAP) and as learning tools (e.g. Python notebooks).
4. There is a need for a coordinated data catalog.



Example of multi-frequency SAR image combination Belgica Bank (NE Greenland), melting phase: first-year ice (darker signature) easier to distinguish from multi-year ice (brighter areas) at L-band, provided by Johansson/Dierking.



Above-ground biomass change, from 2010-2018, using CCI Biomass data product, version 3, provided by M. Santoro. Source for 2010: EnviSat ASAR and ALOS PALSAR. Source for 2018: Sentinel-1 and ALOS-2 PALSAR-2.