

# Land Surface Albedo

- ▶ GCOS requirements
- ▶ Temporal daily to weekly
- ▶ Target spatial resolution 1km
- ▶ Target accuracy 5% relative
- ▶ Hemispherically integrated reflectance of the Earth's surface in the range 0.4-0.7  $\mu\text{m}$  (**or other specific short-wave ranges**)
  
- ▶ **Key activities and time frames to meet deliverables (2011 – 2015)**
  - ▶ **But sadly no money to carry these out**
    - T24-Deliverable 1: Land surface albedo validation protocol
    - T24-Deliverable 2: Validation and intercomparison algorithms
    - T24-Deliverable 3: Satellite albedo products
    - T24-Deliverable 4: Archived in situ network data
    - T24-Deliverable 5: Satellite product intercomparison results
    - T24-Deliverable 6: Satellite products validated against in situ data
    - T24-Deliverable 7: Intercomparison/validation results published in peer-reviewed literature

# Land Surface Albedo Data Sets

- ▶ MODIS MCD43 Global (albedo quantities, brdf, nbar)
  - ▶ 2000-present [http://www.umb.edu/spectralmass/terra\\_aqua\\_modis/](http://www.umb.edu/spectralmass/terra_aqua_modis/)
  - ▶ Gridded 500m; 30 arc-second, 0.05° CMG
  - ▶ Daily
  - ▶ Spectral, Broadband
- ▶ MISR Global (albedo quantities, brdf)
  - ▶ 2000-present
  - ▶ 1.1 km swath
  - ▶ 9 days
  - ▶ Spectral, Broadband PAR
- ▶ VIIRS Global (NOAA broadband albedo, NASA albedo, brdf, nbar)
  - ▶ 2012-present (beta) [http://landweb.nascom.nasa.gov/NPP\\_QA/index.html](http://landweb.nascom.nasa.gov/NPP_QA/index.html)
  - ▶ 1 km NOAA swath, NASA gridded
  - ▶ Daily
  - ▶ NOAA single broadband, NASA spectral, broadband
- ▶ GLOBALbedo Global (MERIS, SPOT-Veg, MODIS priors) albedo, brdf
  - ▶ 1998-2011+ <http://www.globalbedo.org/>
  - ▶ 1km, 0.05°
  - ▶ Spectral, Broadband

# Land Surface Albedo Data Sets

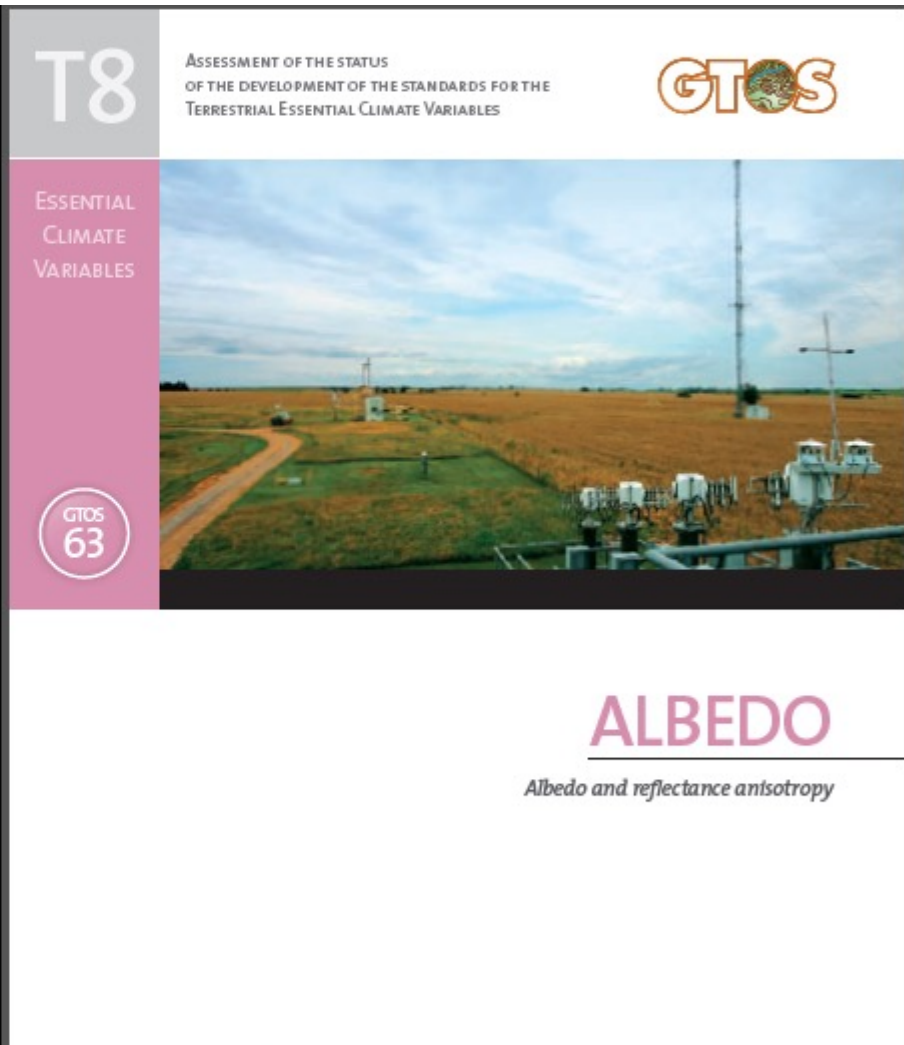
- ▶ CERES Global Albedo (surface modeled)
  - ▶ 2000-present
  - ▶ 1° monthly (20km 2000-2010)
  - ▶ <http://ceres.larc.nasa.gov/products.php?product=CRS-Level2>
  - ▶ [http://ceres.larc.nasa.gov/product\\_availability.php?product=Array&sat=](http://ceres.larc.nasa.gov/product_availability.php?product=Array&sat=)
  - ▶ Broadband
- ▶ POLDER-3/Parasol Global Albedo, BRDF
  - ▶ 2005-2010
  - ▶ 6km 10day
  - ▶ [http://postel.obs-mip.fr/spip.php?page=breve&id\\_breve=34](http://postel.obs-mip.fr/spip.php?page=breve&id_breve=34)
  - ▶ Spectral
- ▶ LSA-SAF MSG/SEVIRI Regional (Europe/Africa/part of South America)
  - ▶ 2005 to present
  - ▶ 3km daily, 10 day
  - ▶ <http://landsaf.meteo.pt/algorithms.jsp;jsessionid=C131E16A8A64F64D5E78BAD6915DCC33?seltab=3&starttab=3>
  - ▶ Spectral, broadband

# Land Surface Albedo Data Sets

- ▶ Geoland-2 -> Copernicus
  - ▶ (SPOT/VGT) global
  - ▶ 1999-present
  - ▶ 1km 10-day
  - ▶ <http://www.vito-eodata.be/PDF/portal/Application.html#Home>
  - ▶ <http://www.geoland2.eu/portal/order/PrepareOperation.do?serviceId=D3808080&operation=Search>
- ▶ SCOPE-CM fusion of GEO albedo products
  - ▶ Meteosat, GOES, GMS
  - ▶ 1975 to present
  - ▶ <http://dx.doi.org/10.1175/BAMS-D-11-00230.1>
  - ▶ [Scope-cm-2](#)
  - ▶ [Include AVHRR](#)
- ▶ GLASS (global)
  - ▶ 8 days <http://glcf.umd.edu/data/abd/>
  - ▶ 1981- 2000 AVHRR 0.05°
  - ▶ 2000-2010 MODIS 1km
  - ▶ Broadband
- ▶ Landsat (uses MODIS priors) regional (North America) (just starting)

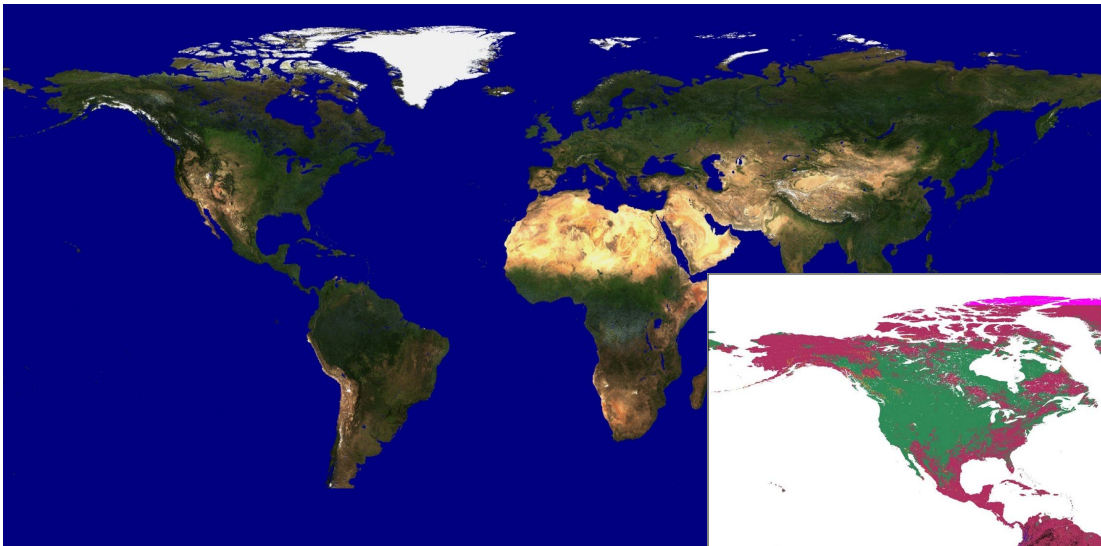
# Accuracy/ Uncertainty (Generally 5-10%)

- ▶ MODIS Global (5%-10%)
  - ▶ Cescatti et al., 2012, Román et al., 2009; 2011; 2013, Wang et al., 2012; 2014
- ▶ VIIRS global
  - ▶ Justice, Román et al., 2013
- ▶ MISR global
  - ▶ Pinty et al., 2010; Taberner et al., 2010
- ▶ GLOBALbedo global
  - ▶ Muller et al., 2012
- ▶ CERES global surface
  - ▶ Rutan et al., 2009
- ▶ POLDER-3/Parasol global
  - ▶ Maignan et al., 2004, Hautecoeur and Roujean, 2004
- ▶ LSA-SAF MSG/SEVIRI Regional
  - ▶ Carrer et al., 2010
- ▶ Geoland-2 g local (SPOT/VGT)
  - ▶ Camacho et al., 2012
- ▶ SCOPE-CM fusion of GEO albedos
  - ▶ Lattanzio et al., 2013
- ▶ GLASS (global)
  - ▶ Liang and Liu, 2012
- ▶ Landsat
  - ▶ Shuai et al., 2011; Román et al., 2013

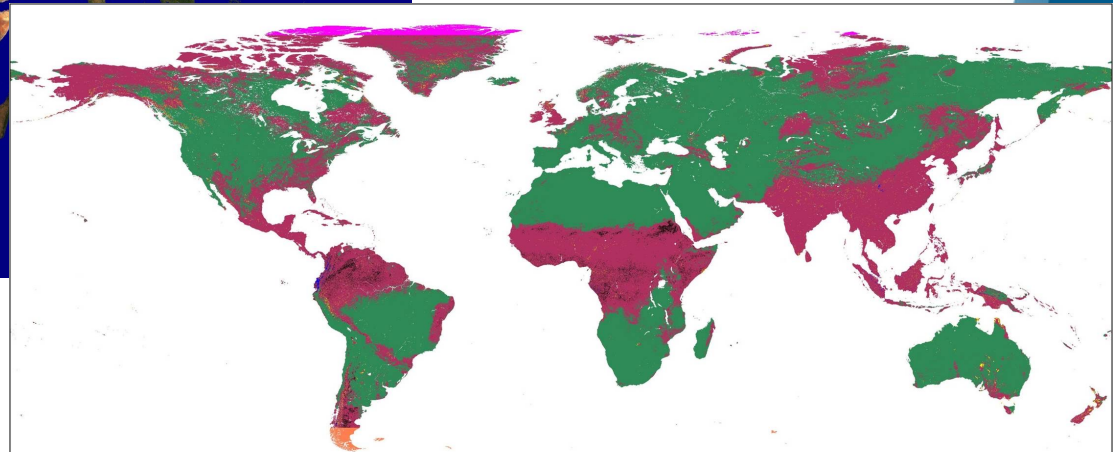


- ▶ Standard validation data sets
  - ▶ BSRN/Surfrad
  - ▶ Fluxnet
  - ▶ NEON, TERN,
  - ▶ Olive, Belmanip,
  - ▶ Pheno-networks?

- ▶ Areas of difficulty (high terrain, ephemeral snow, snow variations, ice (mostly not done), coastal areas)
- ▶ Current and planned Validation efforts and field campaigns in general and particularly those focused on areas of difficulty
  - ▶ NEON, Finnish efforts, ABOVE, what else?



MODIS



- ▶ Summary
- ▶ Albedo GCOS action items (albedo/brdf protocol document)
  - ▶ Román and Wang.
- ▶ BSRN meeting summer 2014

Landsaf

