Evaluation of BRDF/Albedo (& Land Cover): Progress & Plans

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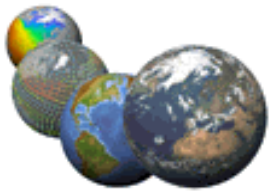
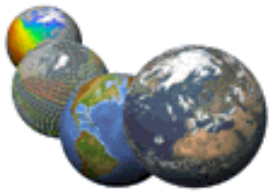
Overview

- MOD43 evaluation over Europe for the 1st 2 16-day products
- MOD43 validation at the Barton Bendish Core validation site
- MOD43 validation through ETM upscaling - example of Switzerland and the Swiss CHARM/BSRN network
- Future plans



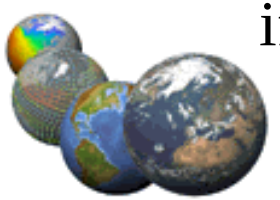
MOD43 evaluation over Europe for the 1st 2 16-day products: Data/method summary

- First 16-day data-set produced for JD=97 and evaluated during LDOPE visit WC 8 May
- Second 16-day MOD43 produced for JD=113, recd 1.6.00
- Focusing on West Europe + SAFARI2000 tiles (not shown)
- Visualisations produced of multispectral albedos (B3), NBAR (B4) and QA flags, especially focused on which pixels had direct inversions (where ≥7 directional reflectances are available)

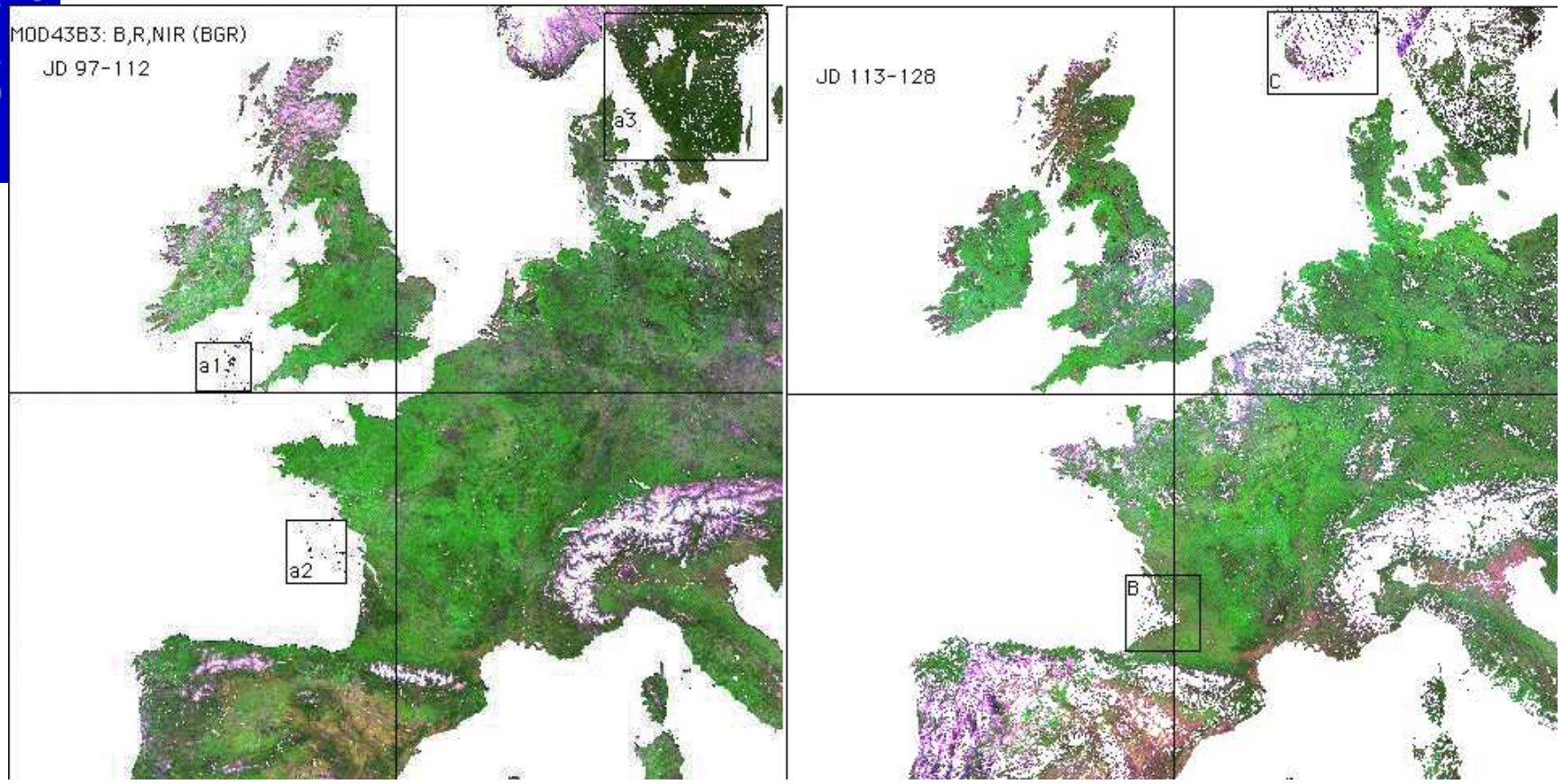


MOD43 evaluation over Europe for the 1st 2 16-day products: Results summary(1)

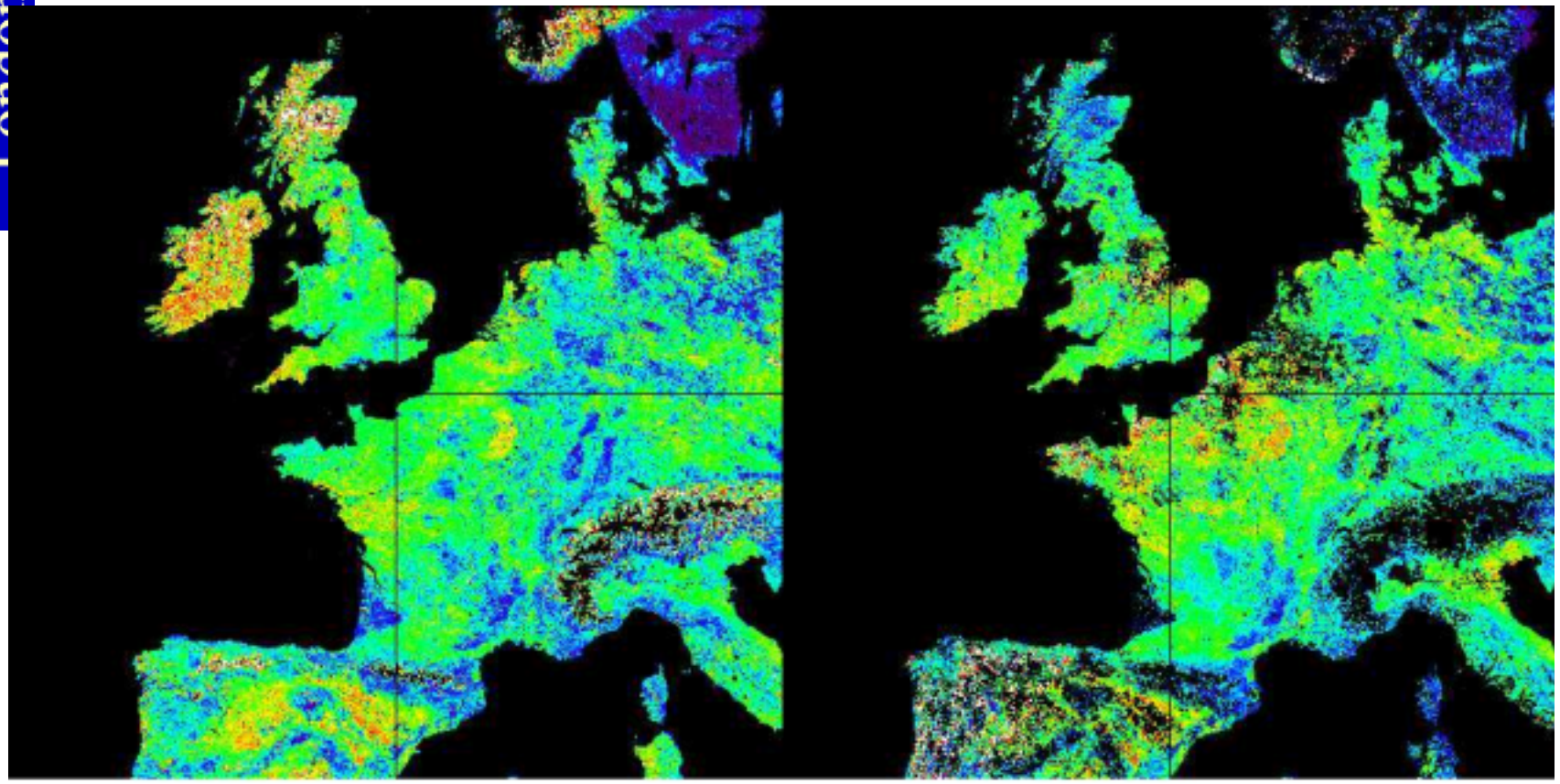
- Overall quality of B3 looks excellent - a very impressive achievement!
- Striping not observed in West Europe data-set (may be due to use of aggregated 1km pixels) but have not looked in detail at Band 6
- Edge of scan observed in B1 (BRDF) but not in B3/B4
- Cloud contamination problems persist. MOD35 appears to make it worse than "minimum blue" as very few cloud-free pixels left, areas with low surface albedo almost disappear
- Only ≤7% of pixels over West Europe were directly inverted for both dates due to cloud & missing data problems. The remainder used the amplitude LUT method if at least 1 look was present (see Strugnell & Lucht, 2000)



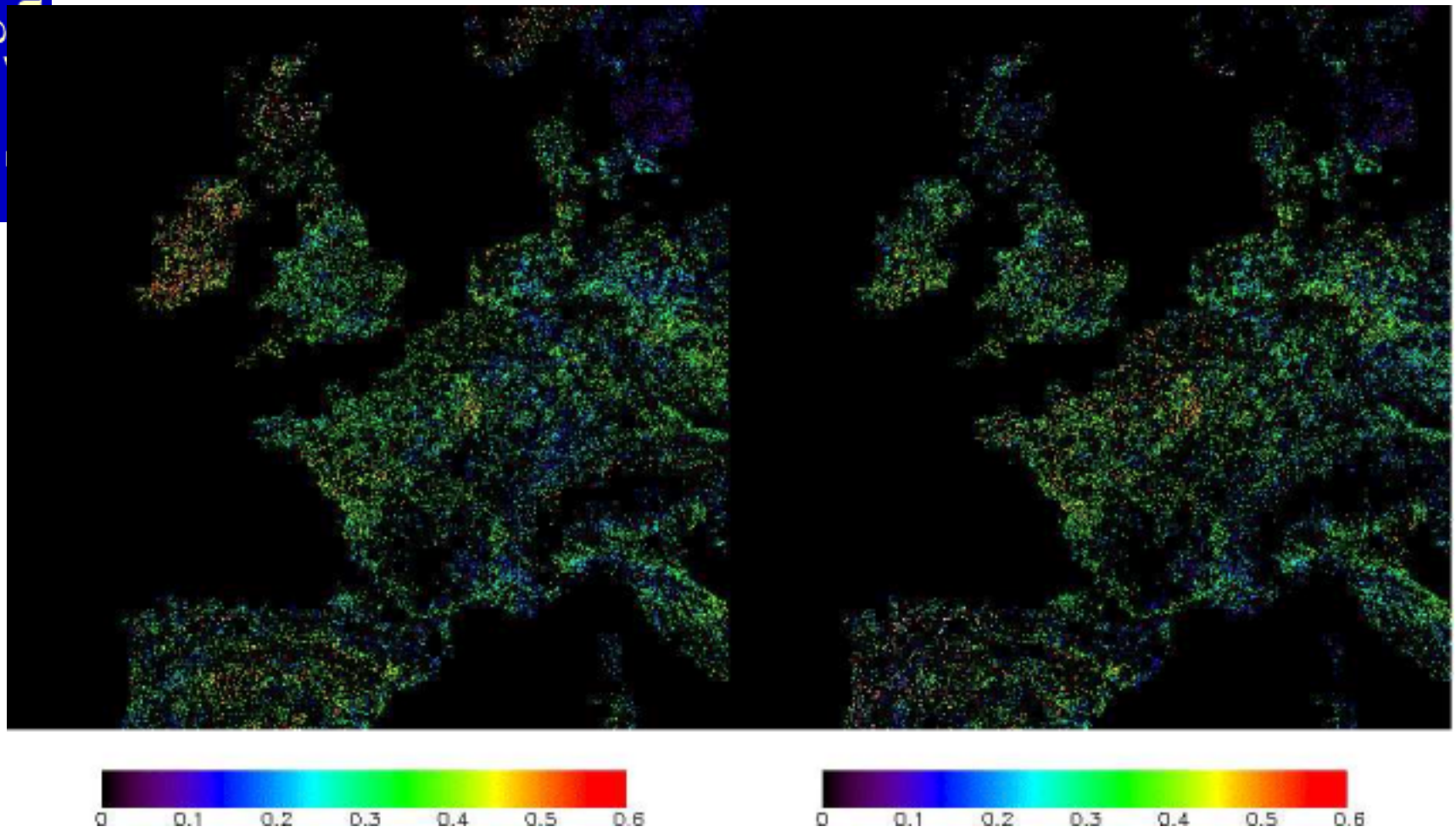
MOD43 evaluation over Europe for the 1st 2 16-day products: Results summary(2) - impact of MOD35



MOD43 evaluation over Europe for the 1st 2 16-day products: Results summary(3) - broadband albedo

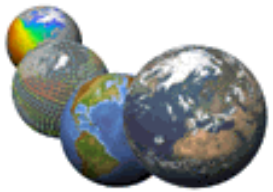


MOD43 evaluation over Europe for the 1st 2 16-day products: Results summary(4) - full inversions



MOD43 validation at the Barton Bendish Core validation site

- In 1999, regular field visits were made to Barton Bendish, a long established UK remote sensing validation site
- In 2000, fieldwork of 2 weeks every month started in April 2000 by staff from UWS and UCL
- Albedo transects performed as well as continuous net radiation measurements from a small tower. LAI measurements regularly performed
- Sun photometer data from a nearby AERONET site (ITE Monks Wood) to be employed to provide aerosol optical depth
- For more details, please visit http://waimea.swan.ac.uk/



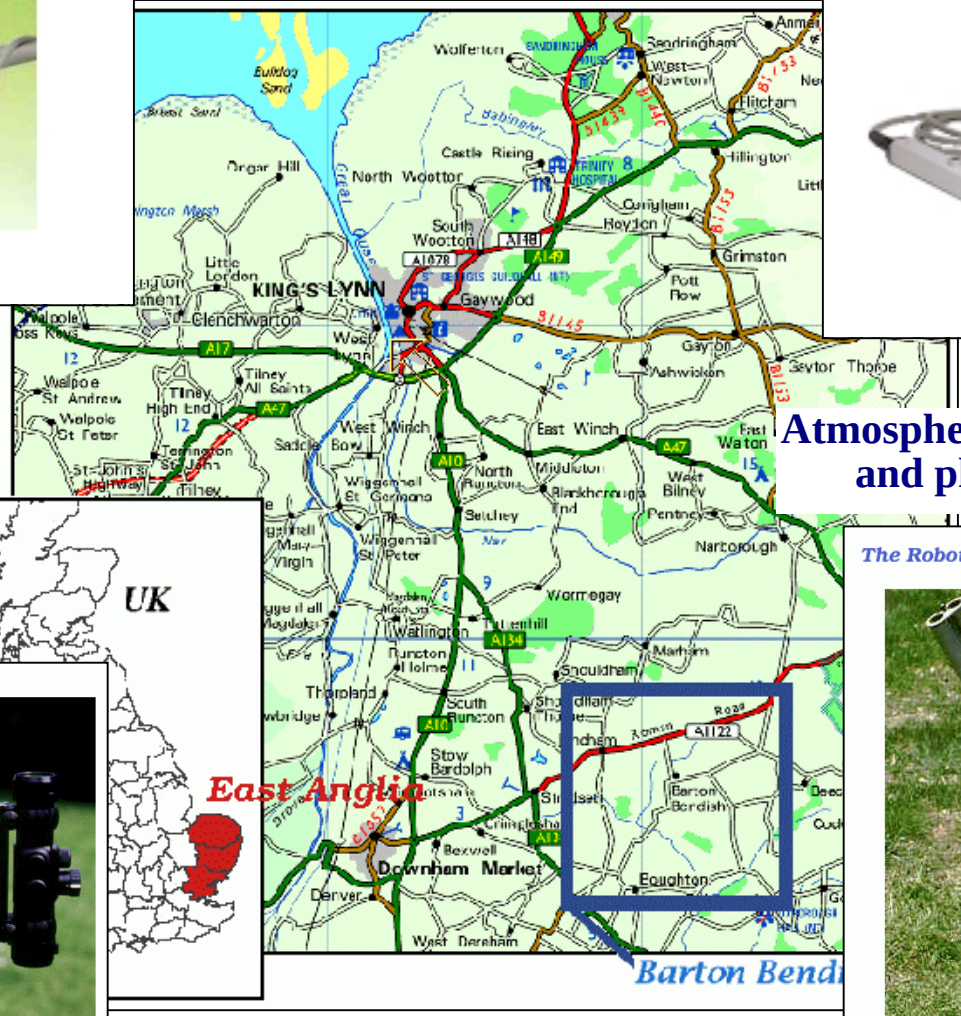
Data Validation: Barton Bendish

Net Radiometer (CNR-1)

Albedo

LAI

Plant Canopy Analyzer (LAI-2000)



Atmospheric optical depth and phase function

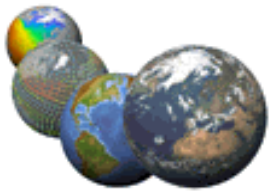
Spectral Reflectance

The optic sensor attached to a tripod

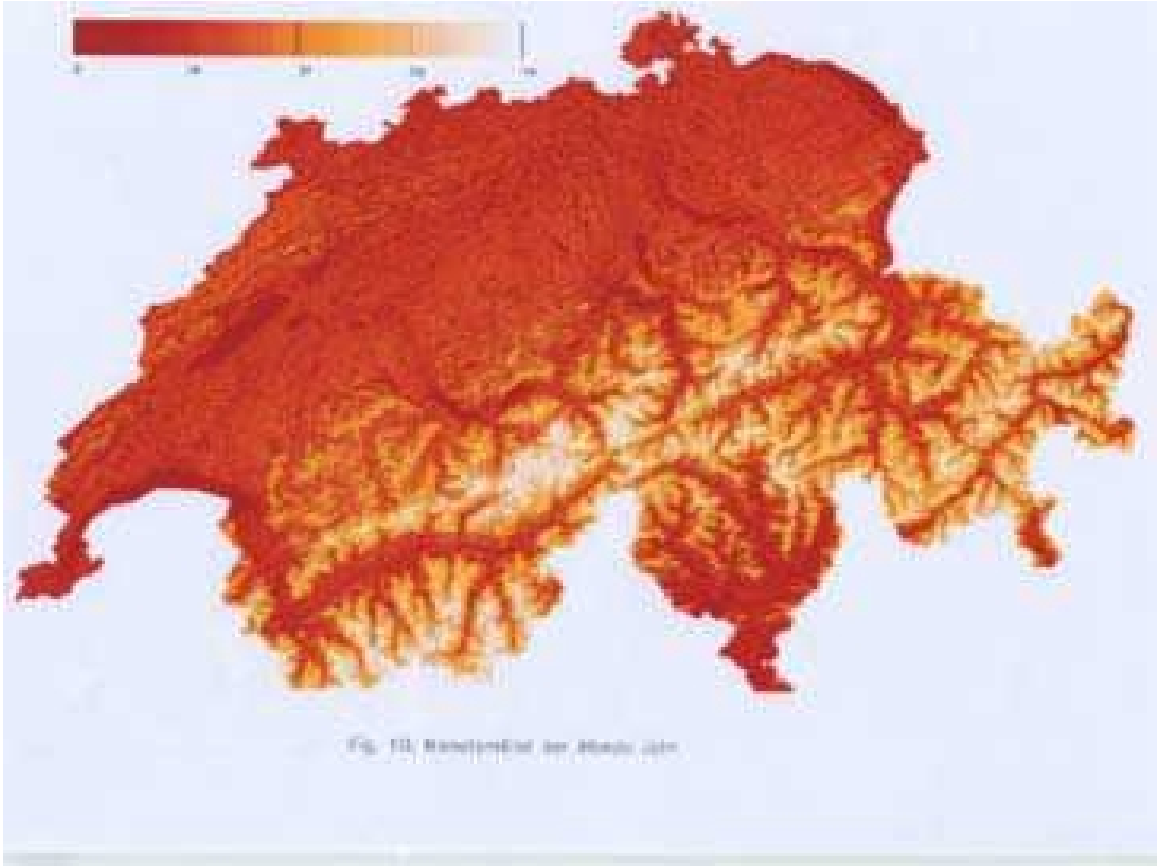
The Robot Arm of the Sun Photometer

MOD43 validation through ETM upscaling - example of Switzerland and the Swiss CHARM/BSRN network

- Ohmura & Gilgen (ETH Zurich) are in charge of WCRP BSRN network
- within Switzerland there is a loose confederation of ground-based net radiation instruments called CHARM which also take continuous measurements
- LANDSAT-TM have been employed to transform seasonal land cover maps at 30m to a broadband albedo map for each season (here shown is an annual mean)
- Such maps will be produced for the UK and EOS core site validation dependent on resources



MOD43 validation through ETM upscaling - example of Switzerland and the Swiss CHARM/BSRN network (courtesy of Ohmura, 00)



Future Work

- Fieldwork at Barton Bendish is being used to establish a database of diurnal albedo measurements which will be employed to assess accuracy of MOD43B3 predictions
- LANDMAP project (www.landmap.ac.uk) is being employed to generate 30m LANDSAT-7 TM albedo map
- Once MOD43 has gone through ≥5 16-day cycles including 10% QA, global data-sets suitable for use in GCMs will be produced
- When land cover is available from BU in GCM-ready land cover classes we plan to test impact cf. IGBP
- Modifications are underway at the Hadley Climate Centre to modify the GCM radiation code to allow
  - spectral albedo output at the exact channels for MODIS, MISR etc
  - Calculation of "black-sky" and "white-sky" albedos