Progress and Plans for MODIS validation and new algorithm development

Jan-Peter Muller, University College London
Professor of Image Understanding and Remote Sensing
MODIS & MISR Science Team Member (NASA EOS Project), HRSC (ESA Mars Express) CoI
with contributions from Catherine Naud, SJ Chan, Chris Doll, Jung-Rack Kim, Zhenhong Li, Mercedes Sole-Chomorro (UCL)

Objectives for next 3 years
- Develop automated algorithms for the extraction of geophysical parameters from MODIS using geomatic engineering, image understanding (IU) techniques and 3D radiative transfer theory
- Develop extensions of existing MODIS global BRDF/Albedo product to take topography into explicit account
- Develop new products for the climate modelling community based on fusion of MODIS and IRS data near-global topography
- Develop fused MODIS-MISR products to exploit the complementarity between their spectral and angular aspects (clouds, aerosols, surface BRDF/Albedo)
- Develop fused MODIS-DMSP products to explore the anthropogenic components of global change
- Develop global validation strategies using independent data-sets as well as inter-comparison between different sensors on the same EO platform.
- Publish individual validation case studies on the web to provide a detailed reference for product users.

Validation of Cloud and Water Vapour Properties from the NASA Terra MODIS and MISR instruments (EU-CLOUDMAP2)

Validation of Aerosol Properties from the NASA Terra MODIS and MISR instruments with street-level urban pollution

Automated building detection from 1m IKONOS

Example Application of IU techniques to Mars
Automated crater detection in MGS-MOC images

Sample publications (2000-2004)

Anthropogenic activities from the DMSP OLS instrument

Night-time Lights as an indicator of human activity
Mapping economic activity from night-time lights
Mapping CO₂ from night-time lights

Excellent at identifying human activities in developed parts of the world. Also highlights human activity in areas such as shipping fleets and off-shore gas fields. Clear economic component when analysing the data.