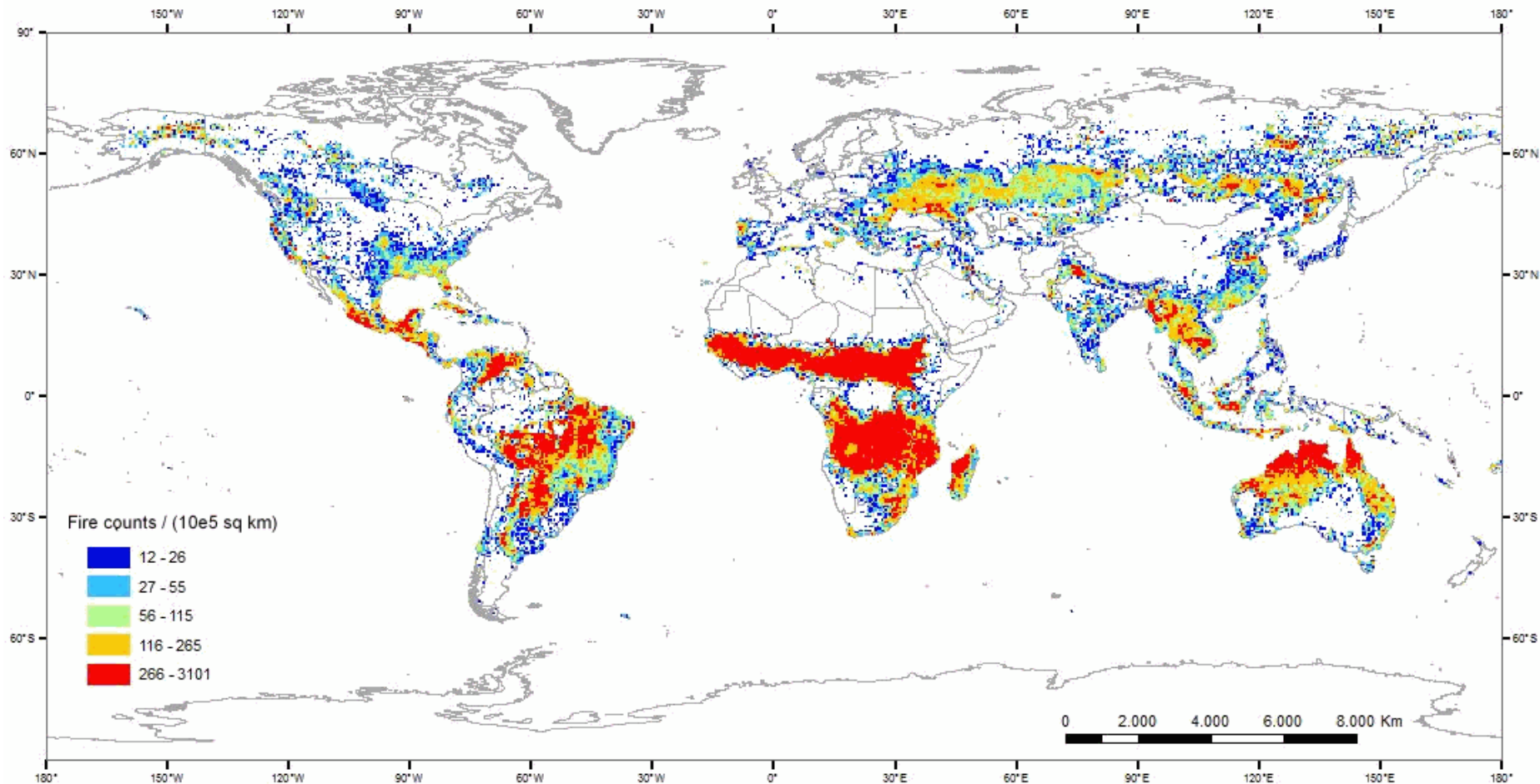




Global Observation of Biomass Burning ECV Fire Disturbance

**Emilio Chuvieco
University of Alcalá (Spain)**

Fire is a global phenomenon...



- Around 3.5 million sq km are burned annually
- From MODIS hot-spot databases, 30% of the emerged world was observed to have some relevant fire activity (Chuvieco et al., 2008, GCB)

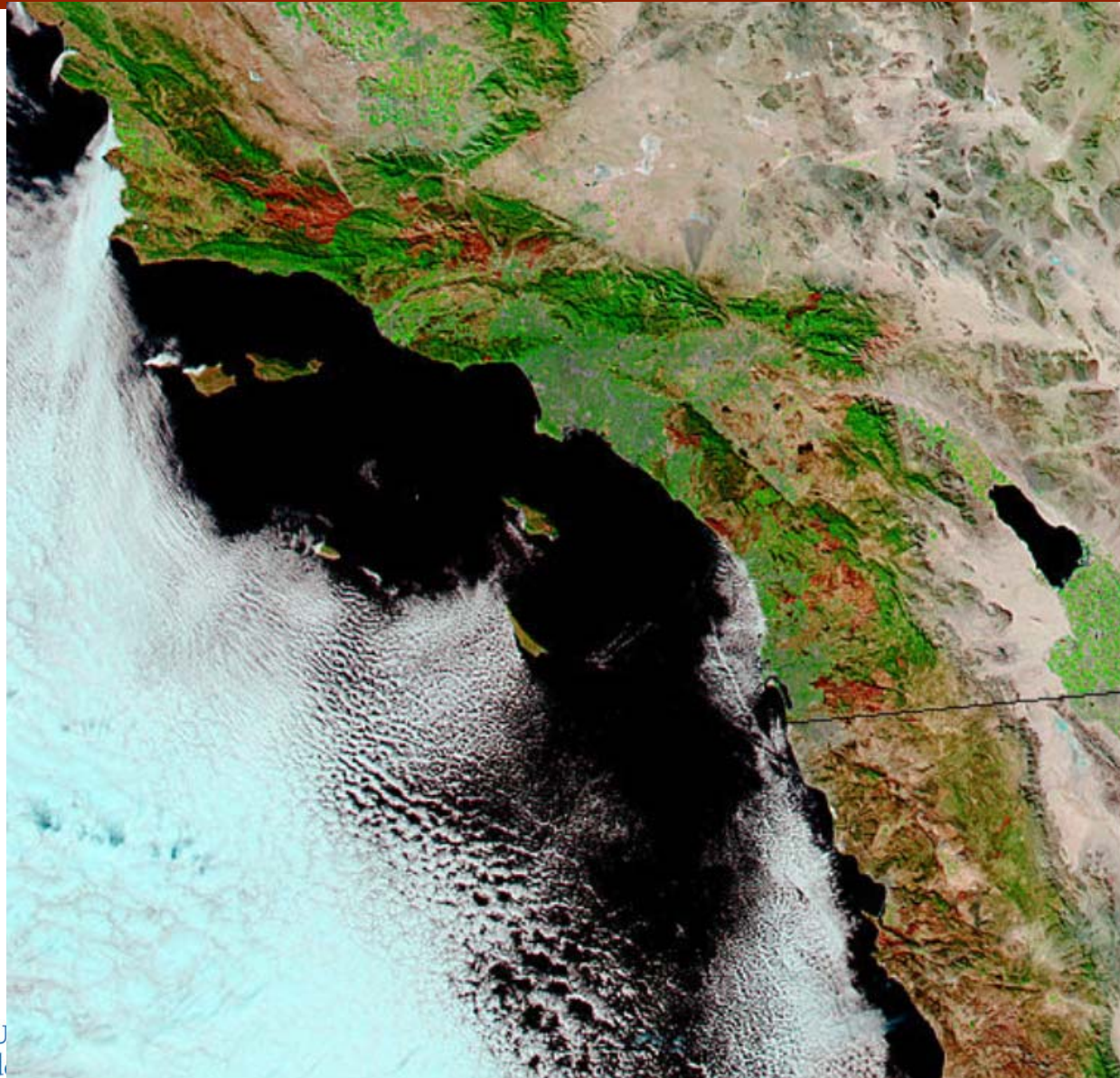
With critical regional implications... Greece, 2007



MERIS images
International Charter



California, 2007



MODIS Image
NASA Rapid Response
System

Australia, 2009

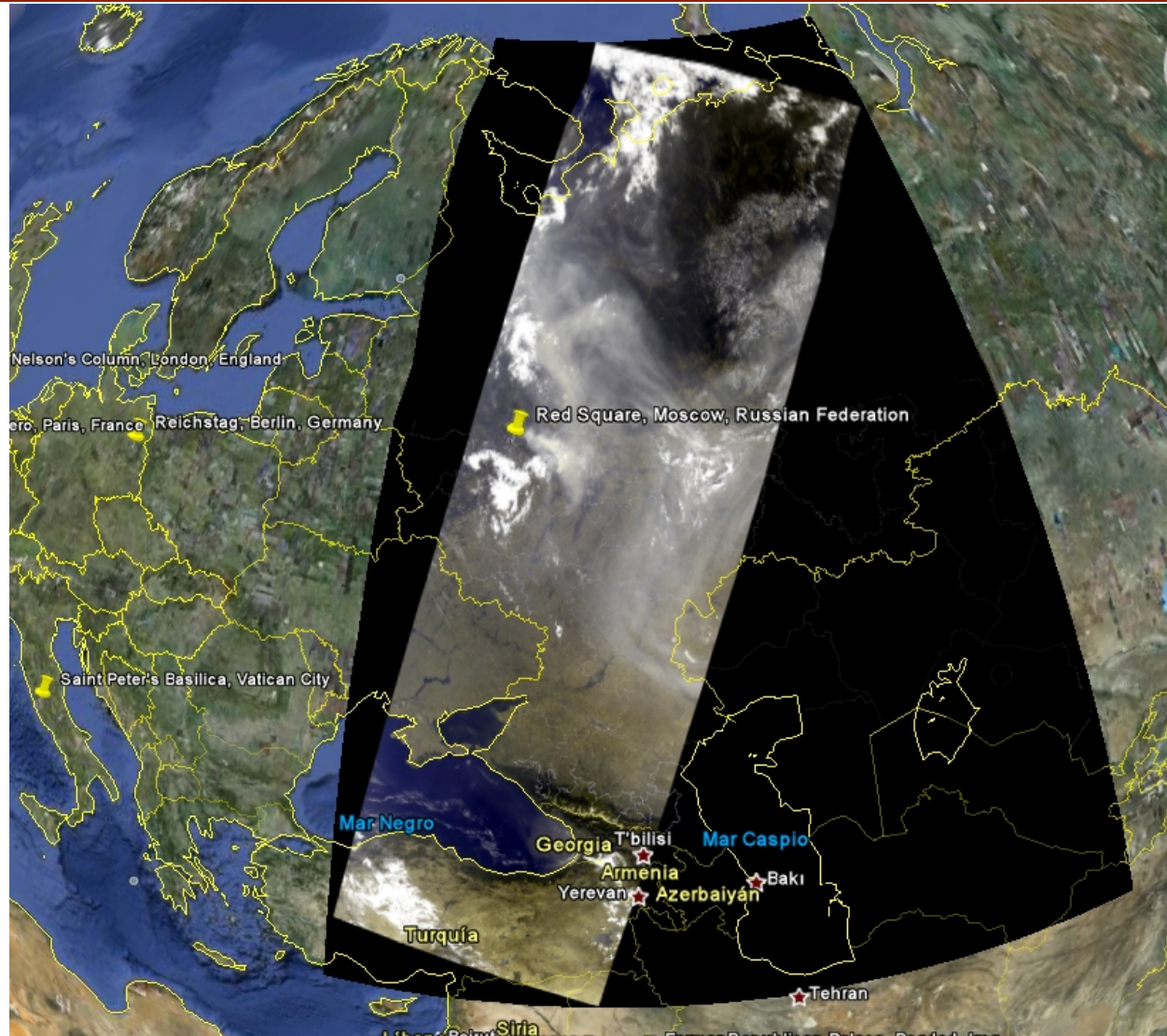


MODIS Images: visibleearth.nasa.gov

Russia, 2010



MERIS
Images.
Courtesy
DLR



Fire factors



- **Climate variability: Dry season / cycles**
(climate change scenarios: fire regimes).
- **Human activities:**
 - Land use management: savannas, agriculture.
 - Land use transformation:
 - Crop / Pasture frontiers: Deforestation.
 - Resource extraction.
 - Land abandonment.
 - Fire policy.



Fire effects



- Human life-health.
- Atmospheric composition:
 - Direct Fire GHG emissions
 - Reduction of carbon sinks.
- Vegetation structure:
 - Fire-prone species.
 - Substitution of land cover.
- Biodiversity.
- Soil degradation.
- Hydrological cycle.



**Impacts
depend on
fire regimes.**

Scientific Questions



- **What is the actual magnitude of fire impacts?**
 - How much area is burned annually?
 - How much biomass is actually consumed?
 - Is biomass burning “carbon neutral”?
- **What are the recent trends in fire activity?**
 - Are natural fire regimes changing?
 - What are the main factors? (Warming, land use change).

Uncertainty in BA estimation

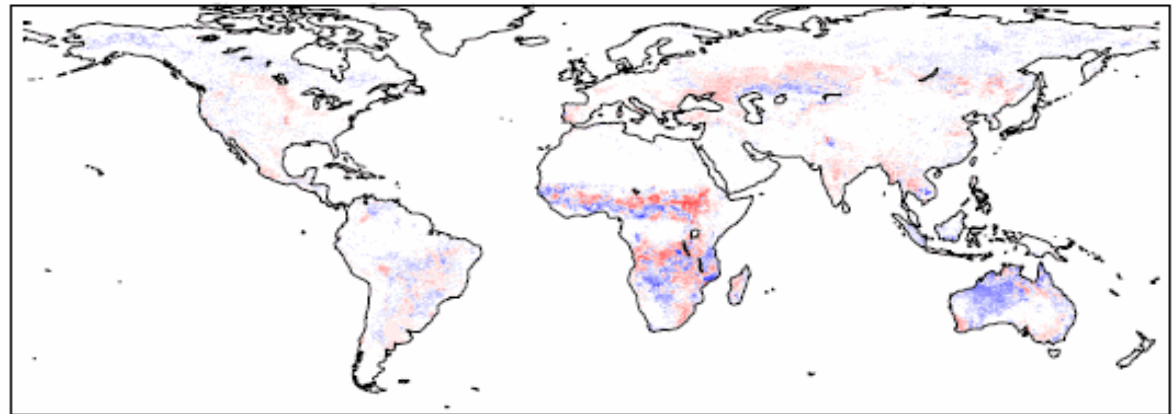
% of BA from different
satellite products

Red: over estimation

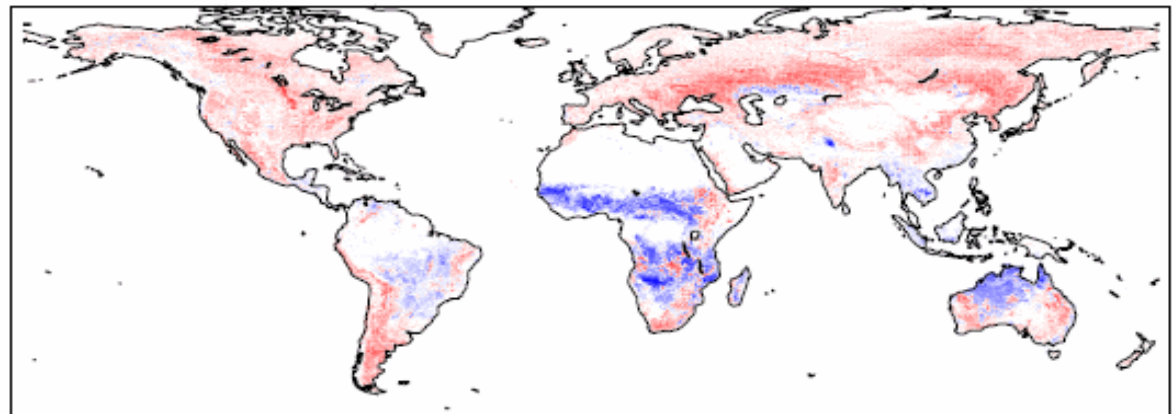
Blue: under estimation

(Giglio et al., 2010).

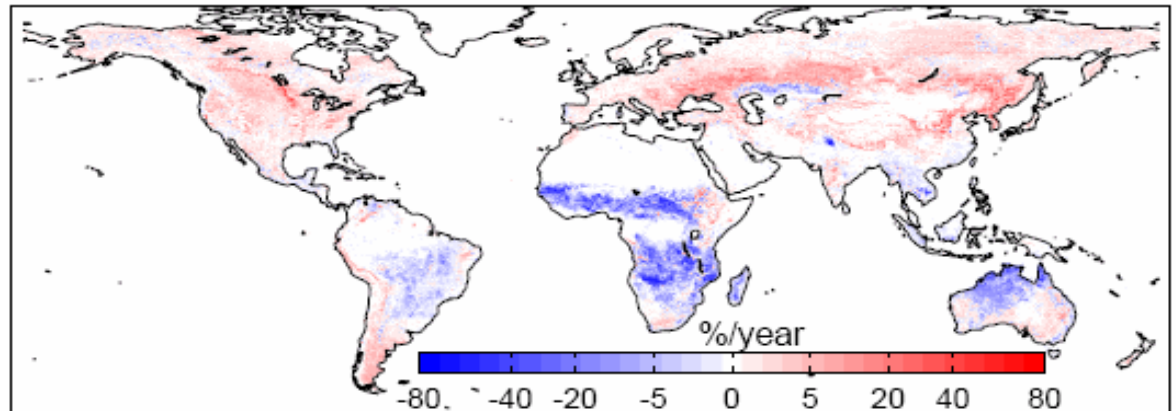
MCD45 - GFED3



L3JRC - GFED3



GLOBCARBON - GFED3



Fires are carbon neutral?



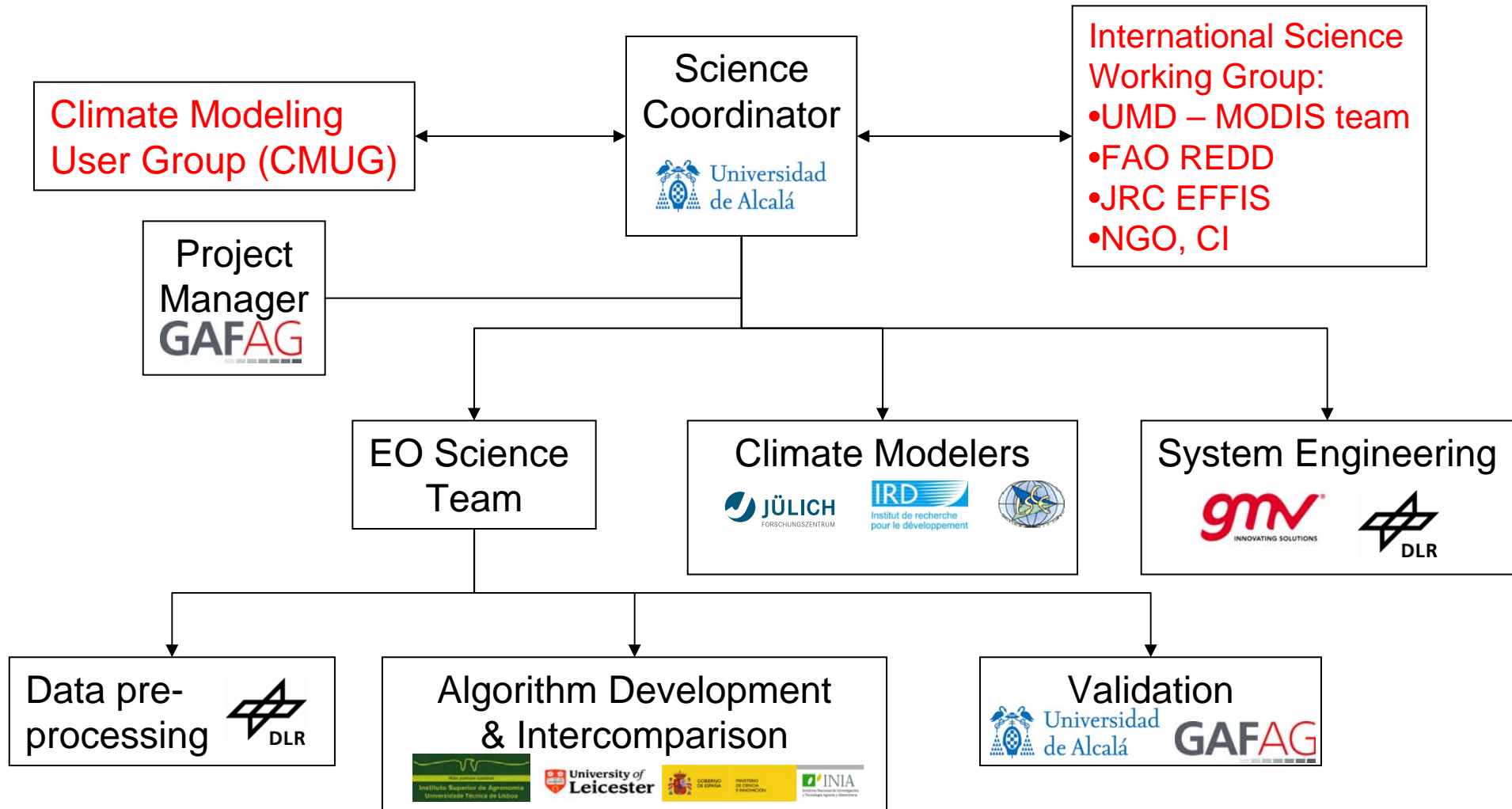
- “Vegetation fires can be a significant source of CO₂ and CH₄ to the atmosphere on annual time scales, but much of the CO₂ is recaptured by the terrestrial biosphere on decadal time scales if the vegetation regrows” (**IPCC AR4**, WG I, p. 514).

Main goals of the Fire CCI



- Define user needs for global Burned Area (BA) data: climate mainly (REDD+, civil protection...).
- Develop methods to generate long & accurate global BA time series from ATSR-VGT-MERIS data.
- Test improvements of climate-vegetation-carbon models with new BA data.

Consortium composition



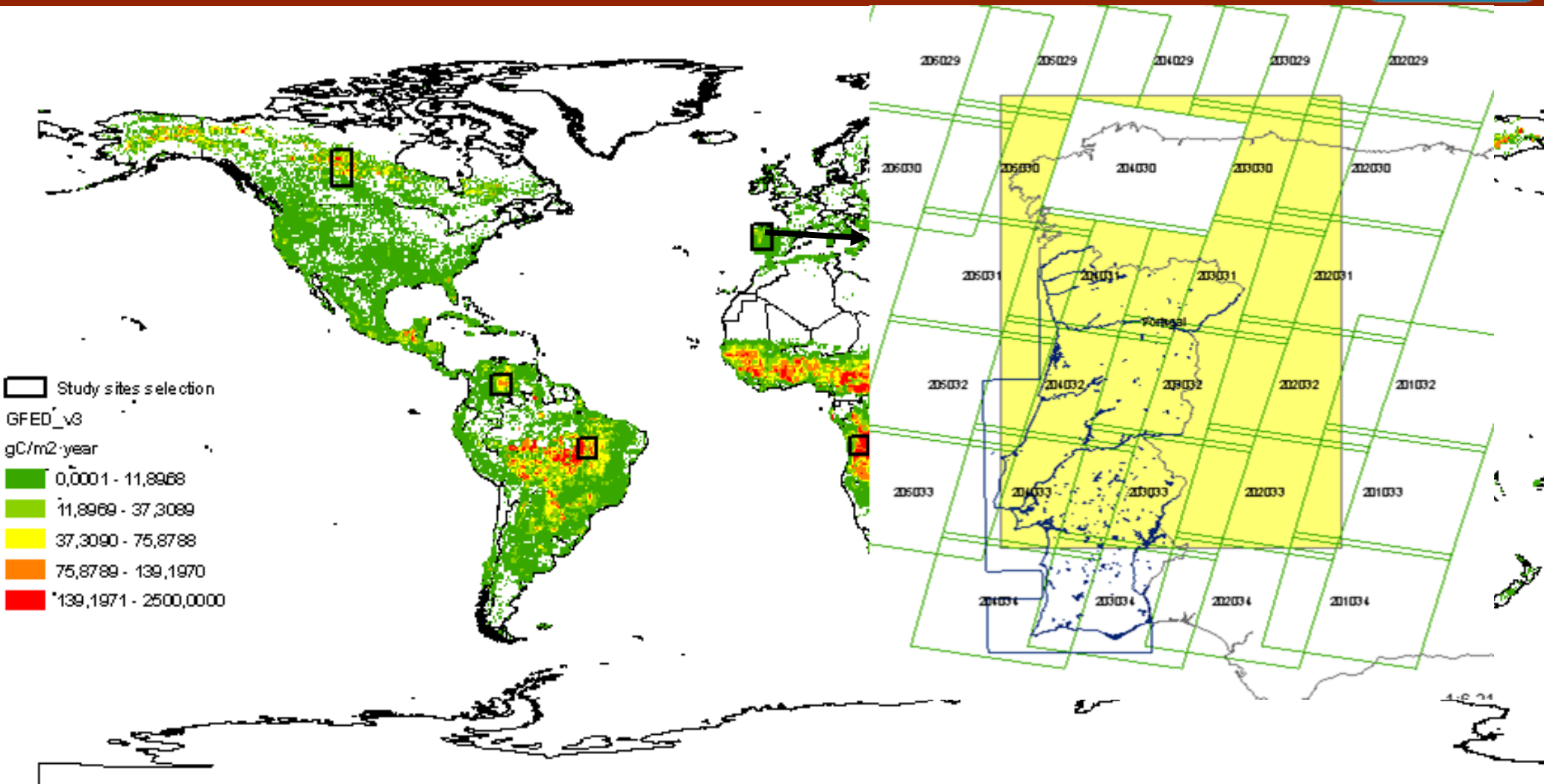
+ External Collaborators

BA Production targets

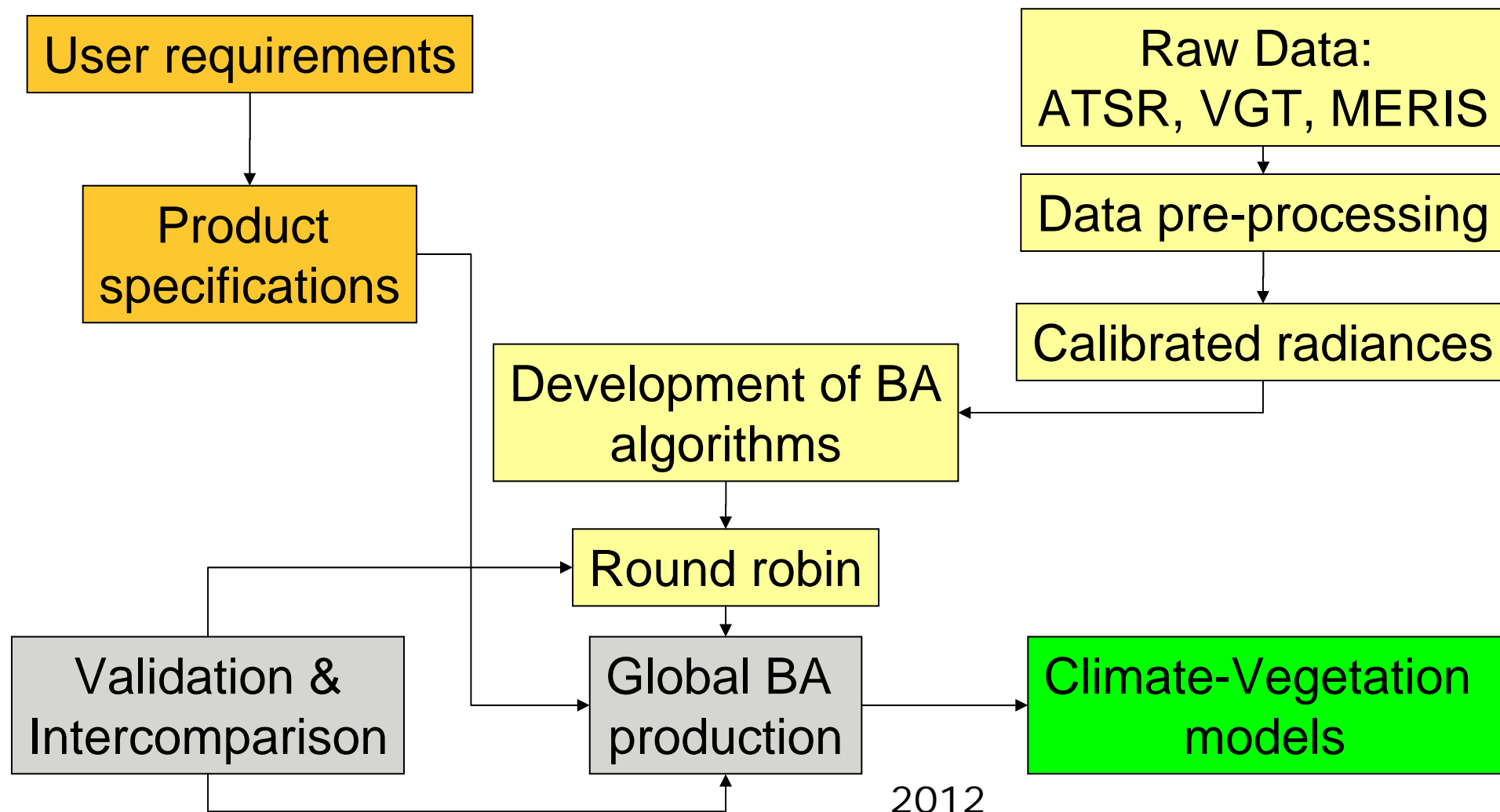


- **Temporal series over 10 selected areas (500x500 km) (1995-2009):**
 - Assure spatial accuracy and stability.
 - Consistency across multiple satellites
 - Demonstrate full-time series available.
- **Global coverage for five years:**
 - Demonstrate the semi-operational processing.
 - Ensemble chain, bulk processing of data.

Study sites



Processing flow



Validation: reference data

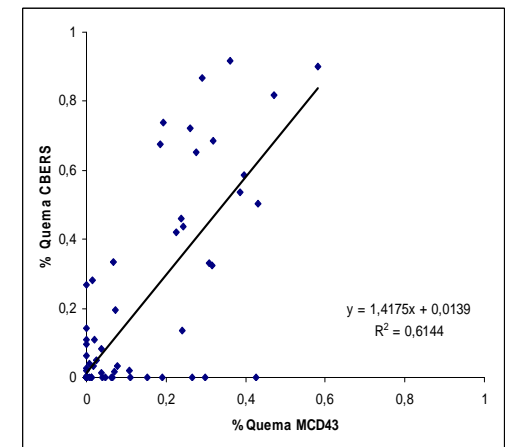
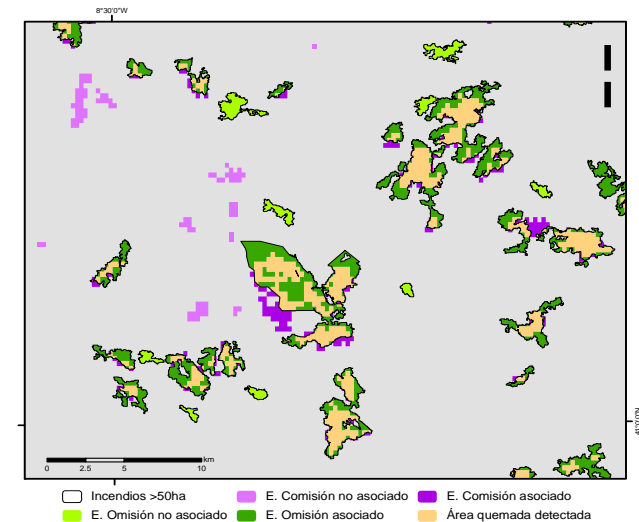


- **High resolution images:**
 - Landsat-TM/ETM+ multitemporal change detection. More than 300 images will be processed.
 - Other images (SPOT, IRS, ASTER, CBERS...).
- **Fire perimeters: Canada, USA, Portugal.**
- **Available validation datasets (L3JRC, Globcarbon, MODIS, regional projects).**

Validation Methods



- Confusion Matrix.
- Correlation measures (Reference-Output).
- Number of detected BA patches.
- Reference data will be publicly available.



Current status



- **KOM: September 9-10, 2010.**
- **User Requirement analysis.**
- **Definition of product specifications and contents.**
- **Pre-processing of study sites.**
- **Generation of validation data for study sites.**
- **Development of the Round-Robin software.**

<http://www.esa-fire-cci.org/>



- **Thank you! / Gracias! / Merci!**



- **emilio.chuvieco@uah.es**