

# **JULES & CLASSIC**

Peter Cox

# CLASSIC Partners

- University of Wales Swansea (Mike Barnsley, Sietse Los, Peter North, Graham Weedon)
- CEH Wallingford (Richard Harding, Chris Taylor)
- CEH Monks Wood (France Gerard)
- University of Durham (Brian Huntley, Bob Baxter)
- Met Office, Hadley Centre (Martin Best, Stephen Sitch)
- University of Leicester (Heiko Balzter, Joerg Kaduk)
- University of Exeter (Peter Cox)

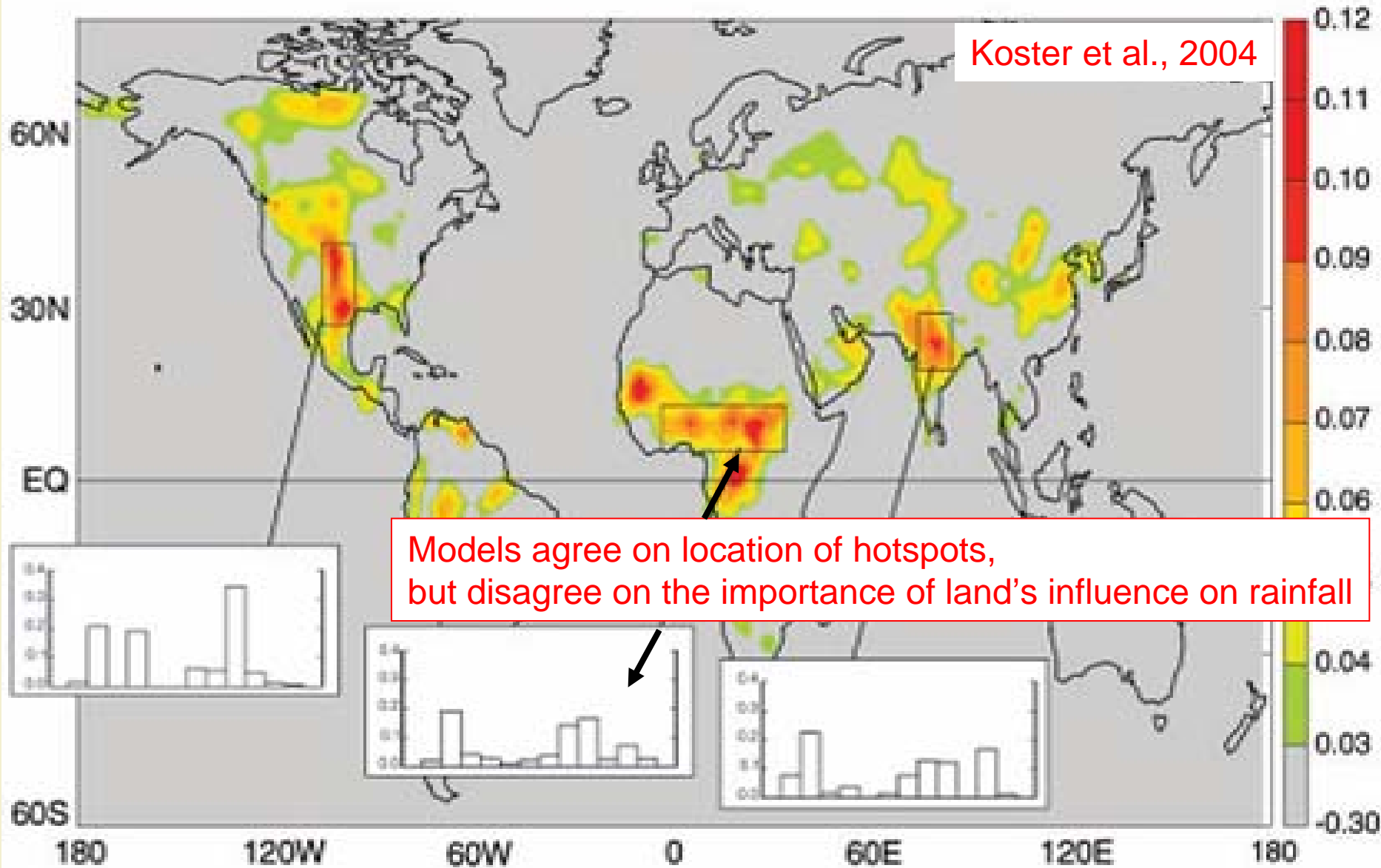
# The CLASSIC Mission

*To utilise Earth Observation to quantify interactions between the land surface and the atmosphere on diurnal to decadal timescales*

# CLASSIC Goals

- To improve the understanding of feedbacks between the land surface and atmosphere;

### Land-atmosphere coupling strength (JJA), averaged across AGCMs

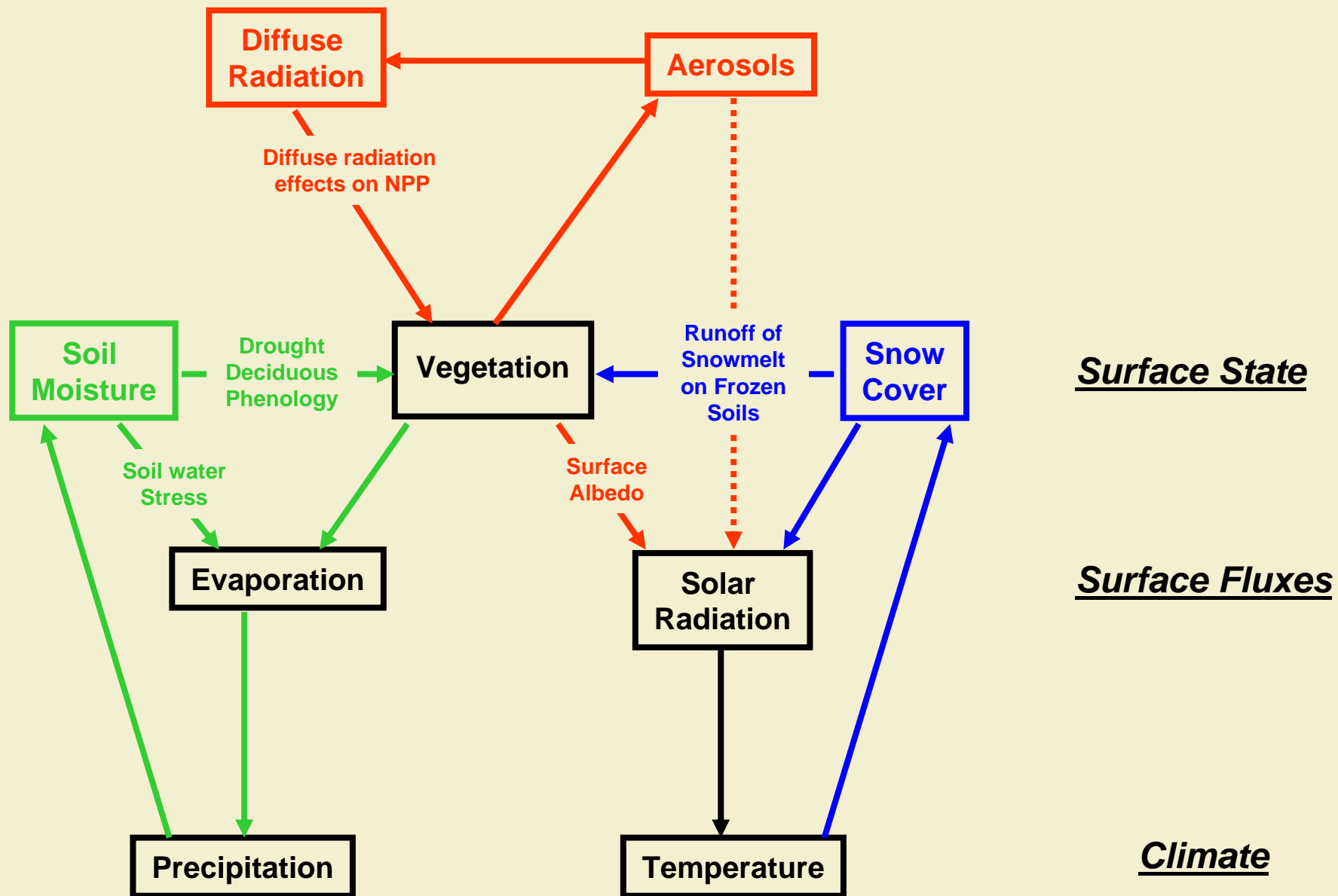


# CLASSIC Goals

- To improve the understanding of feedbacks between the land surface and atmosphere;
- To improve the representation of land-surface processes in climate and Earth system models;

**..through contributions to the development of JULES and land-surface datasets....**

# Science Priorities & JULES Developments

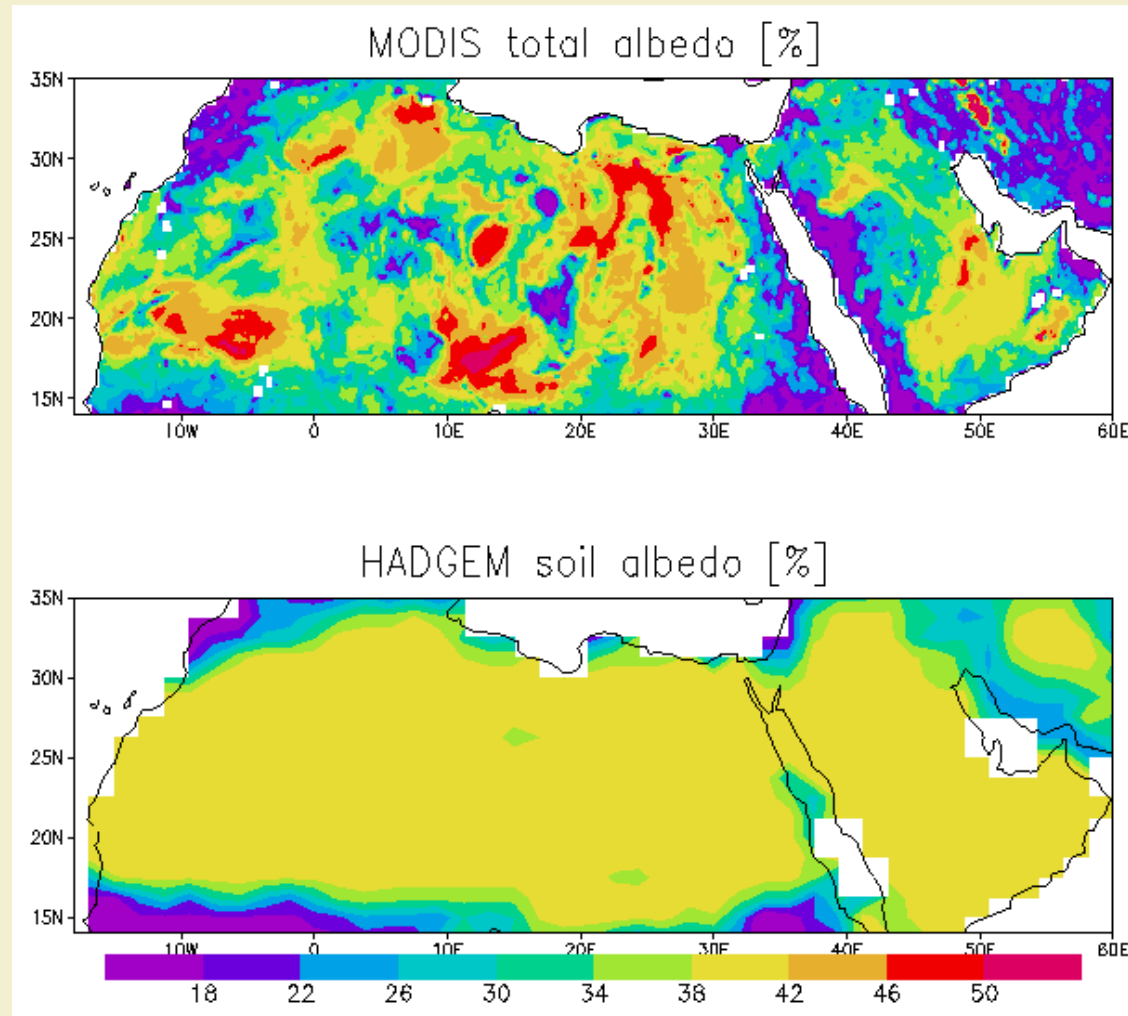


## **Improvements to JULES : Contribution of CLASSIC**

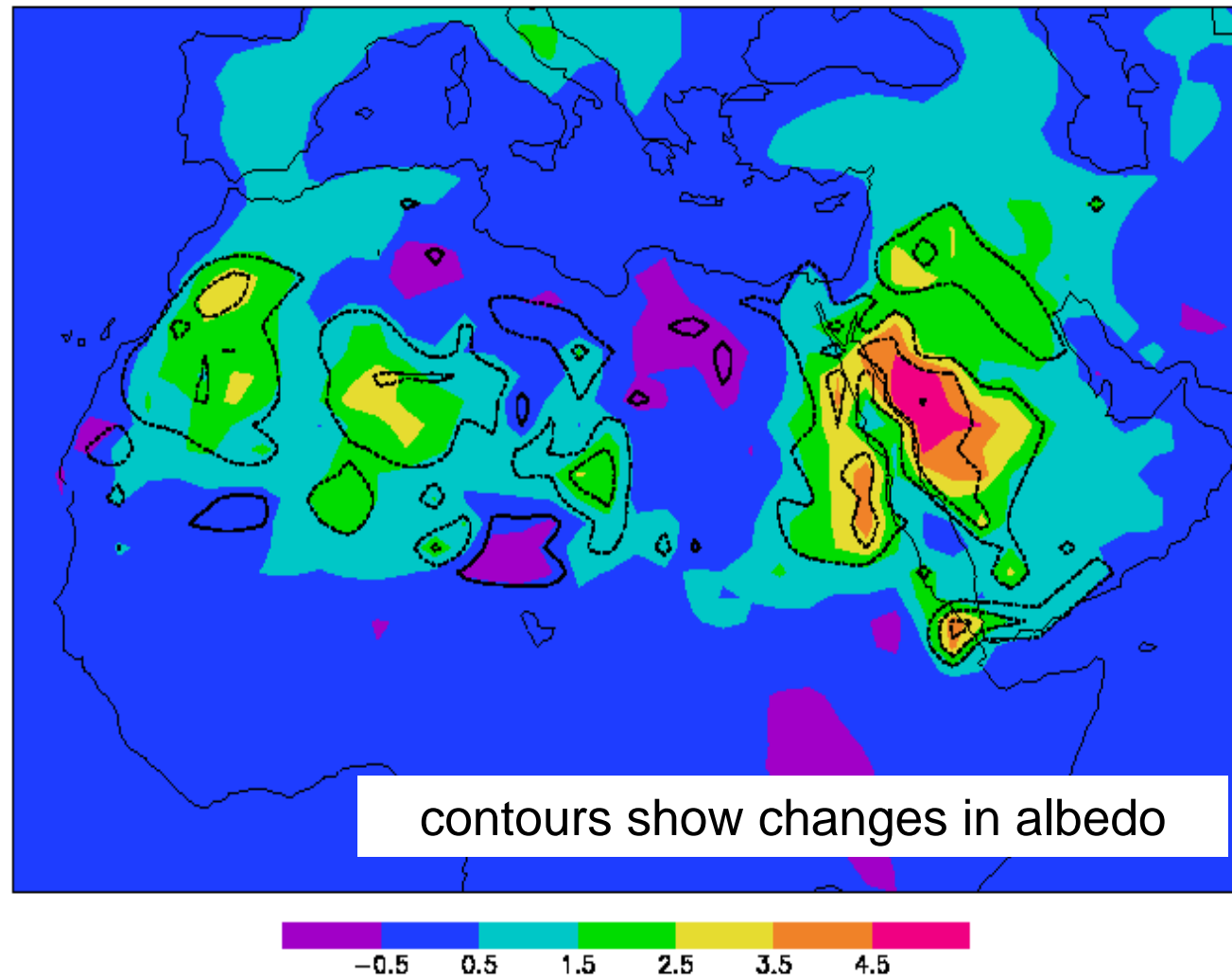
- Land-surface characteristics from EO, including LAI and albedo (Dec 2006)
- Radiation transfer through the canopy, including diffuse radiation and sun-fleck effects (June 2007)
- Drought-deciduous leaf phenology (June 2007)
- Models of surface albedo (Oct 2007)
- Snow and frozen soil modelling, including snowmelt runoff on frozen soils (Dec 2007)
- Soil water stress and plant water status (Mar 2008)



Existing albedo in HadGAM has large biases,  
notably over the Sahara

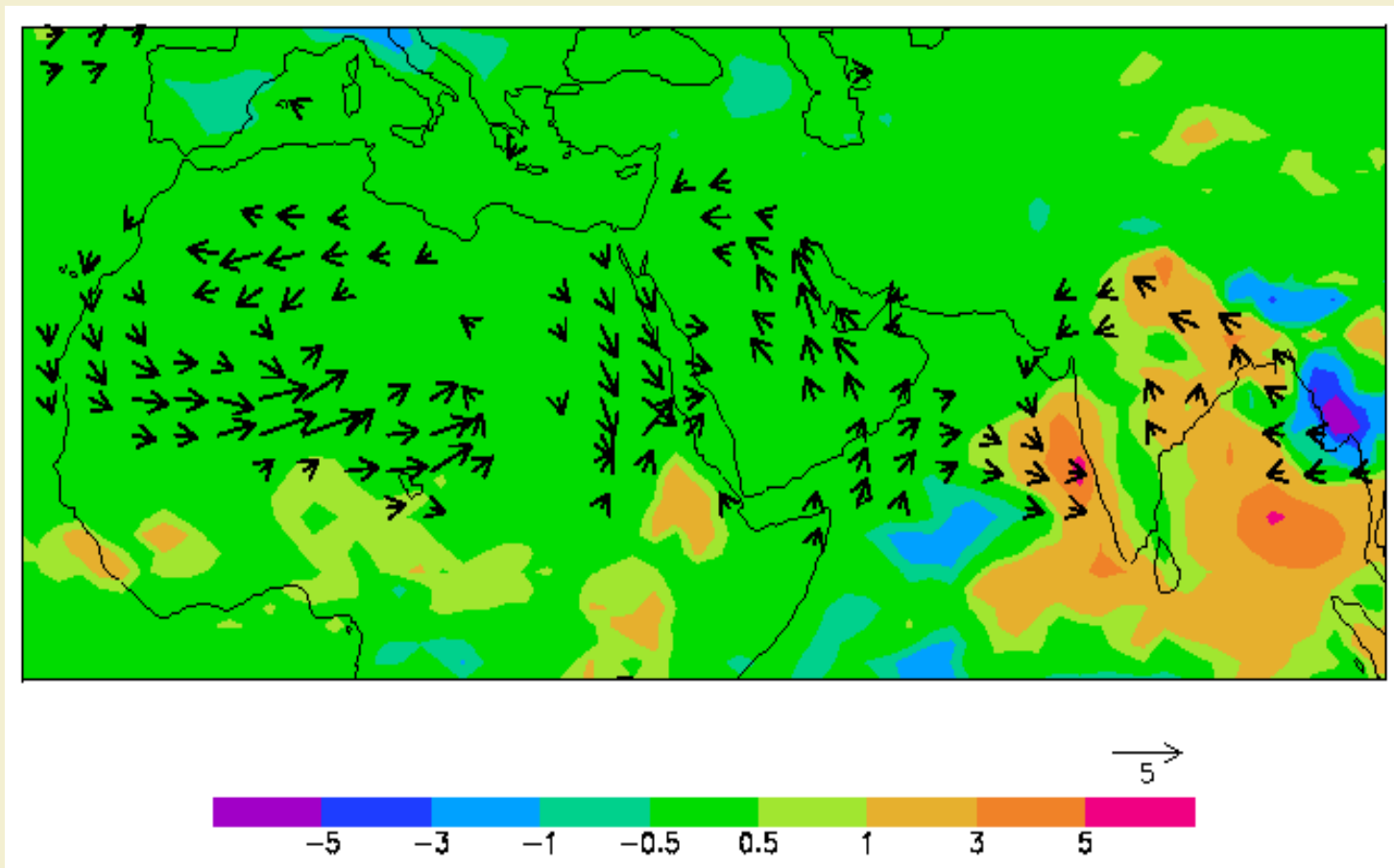


## Impact of new albedo in HadGAM GCM : Change in Temperature at 1.5m in JJA



## Impact of new albedo in HadGAM GCM :

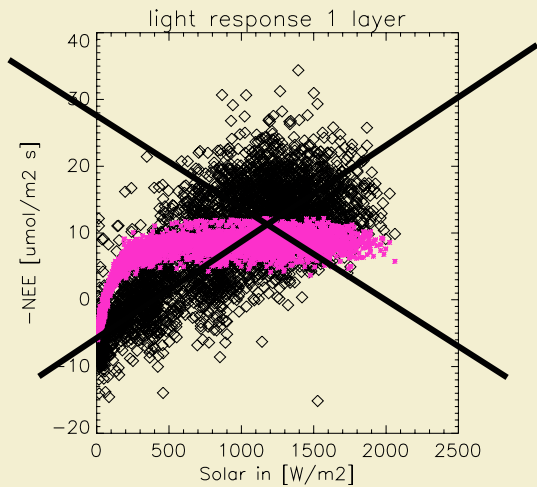
Enhances African monsoon precip (shaded) and affects Asian monsoon



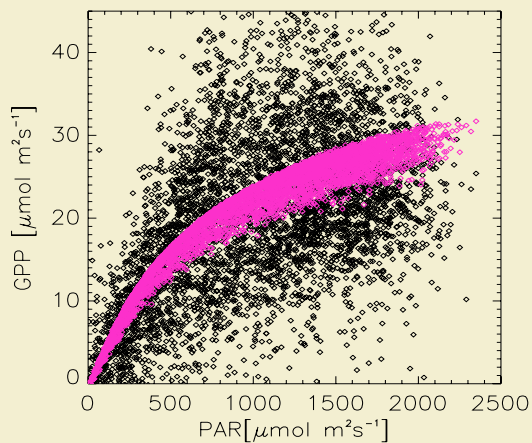
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# Improving processes in JULES



- Big leaf – unrealistic representation



- 10-layer improved 'Light mod'  
Far more realistic

- Importance of canopy structure and leaf angle inclination

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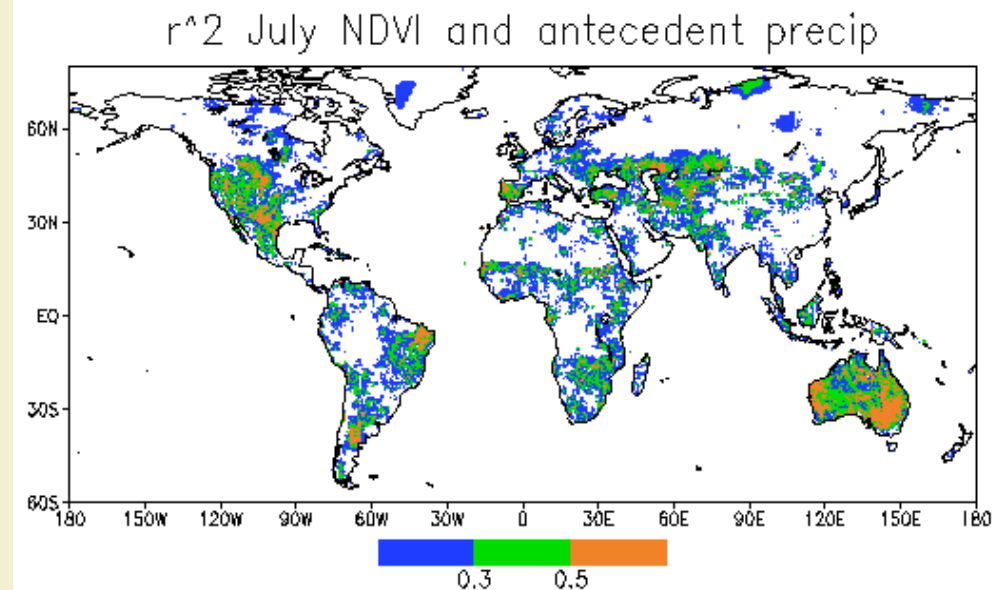
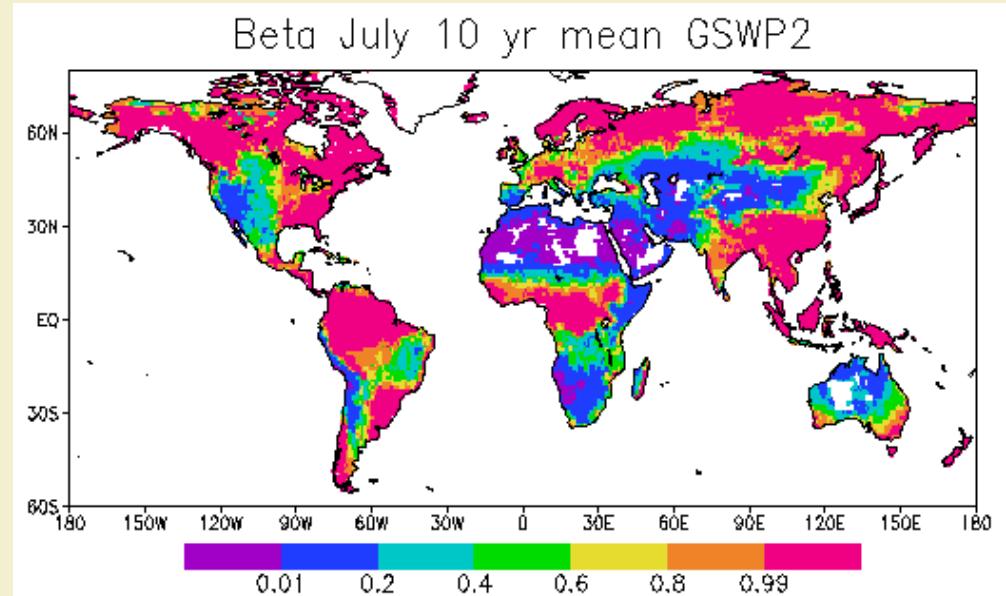
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## Soil Moisture Availability Simulated by JULES

## Correlation between precipitation and NDVI

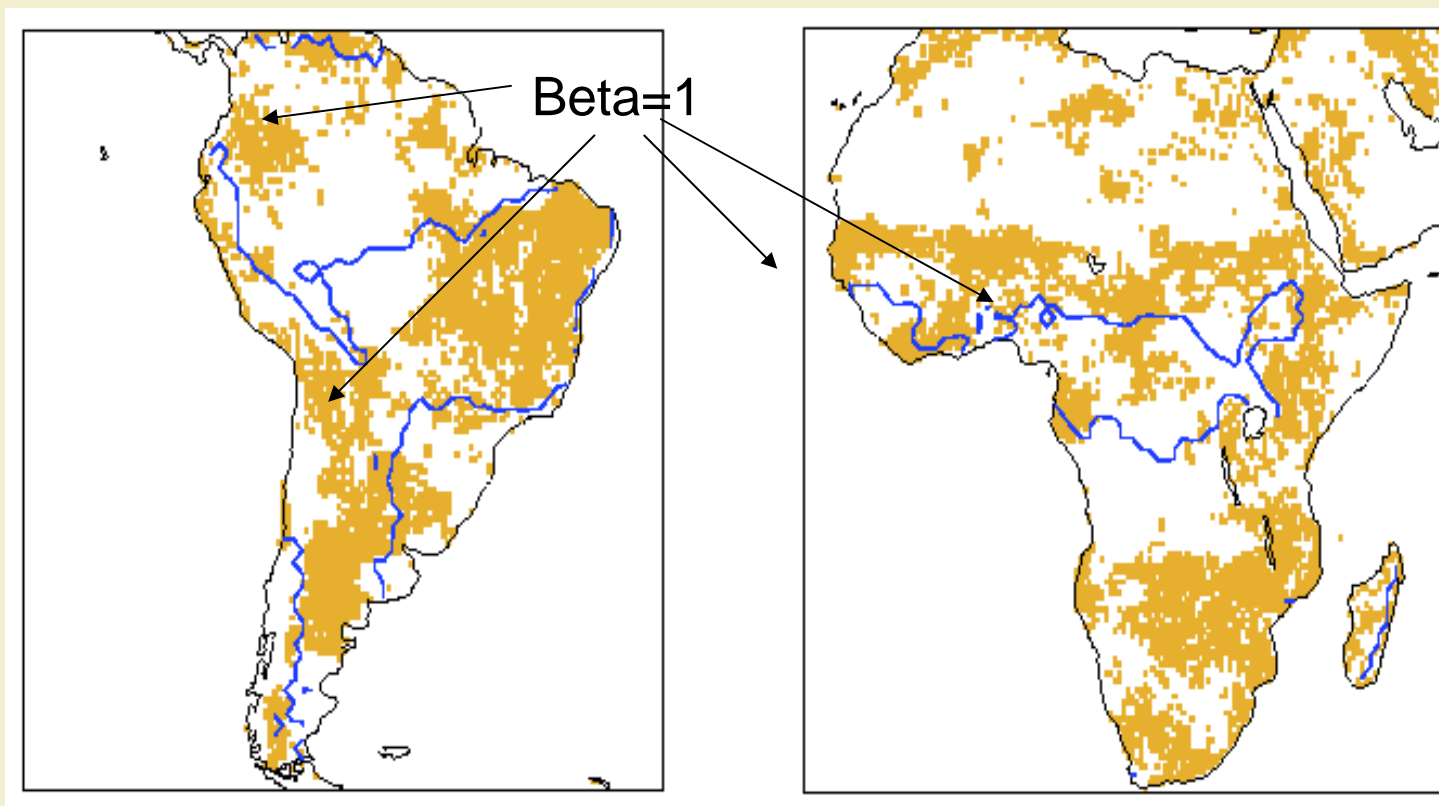
a perfect model would show no pixels in lower panel when beta=1 (i.e. unstressed, pink in top panel)

→ encouraging agreement at large-scales



## Soil Moisture Availability and dependence of NDVI on rainfall

Orange areas have significant positive correlation between observed precip and NDVI





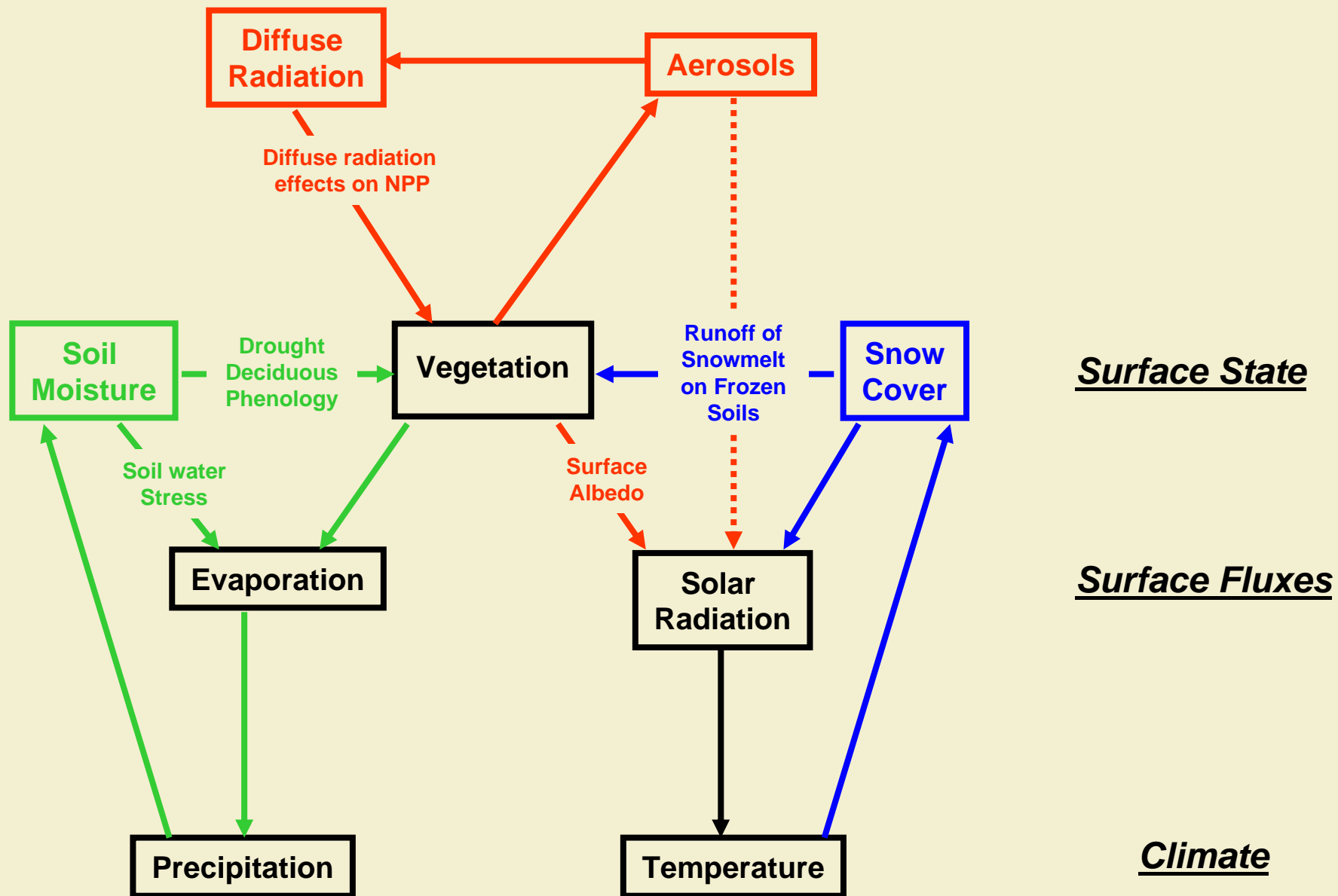
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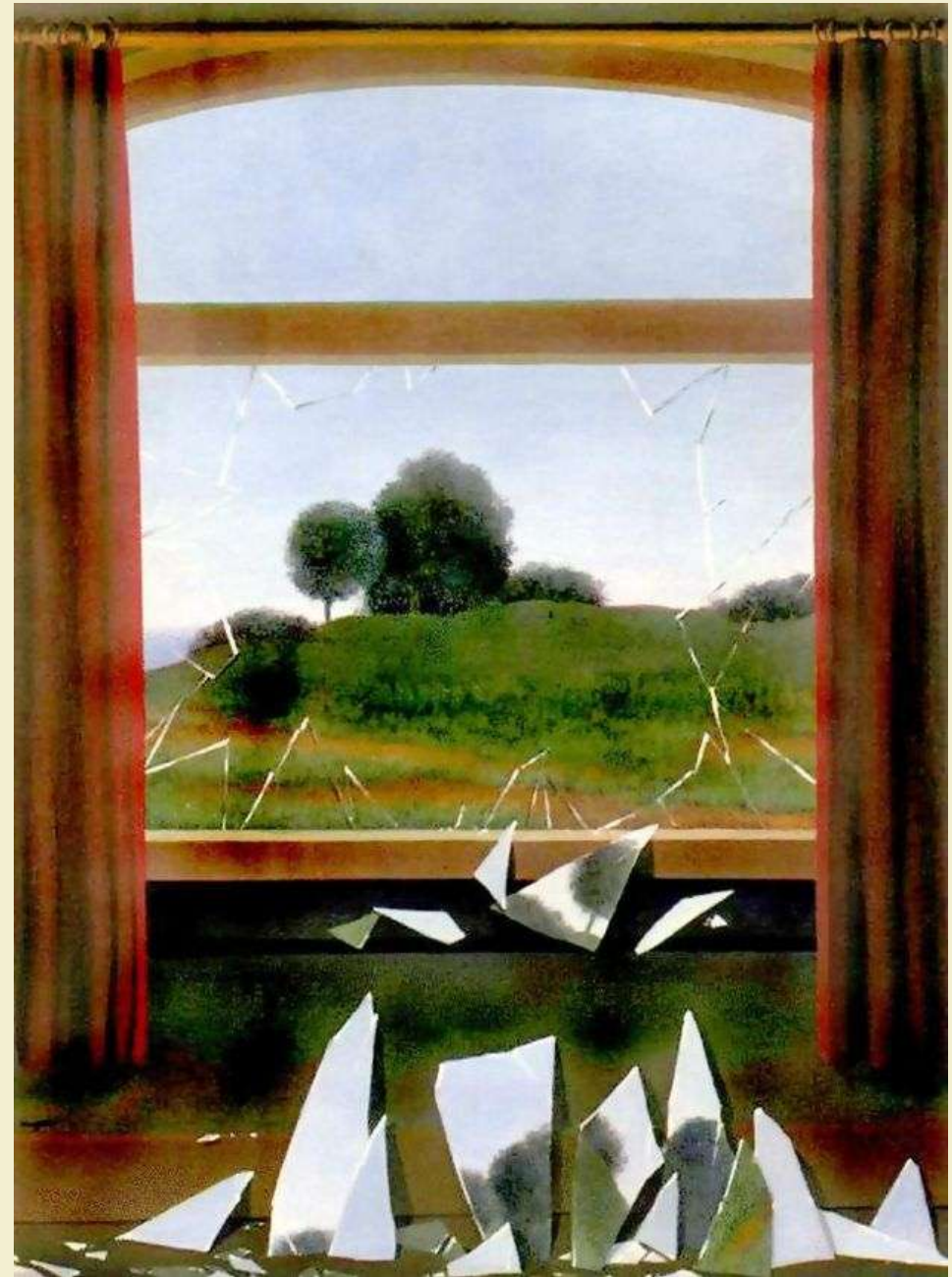
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# Science Priorities & JULES Developments



***THE END !***



# Organisation

