

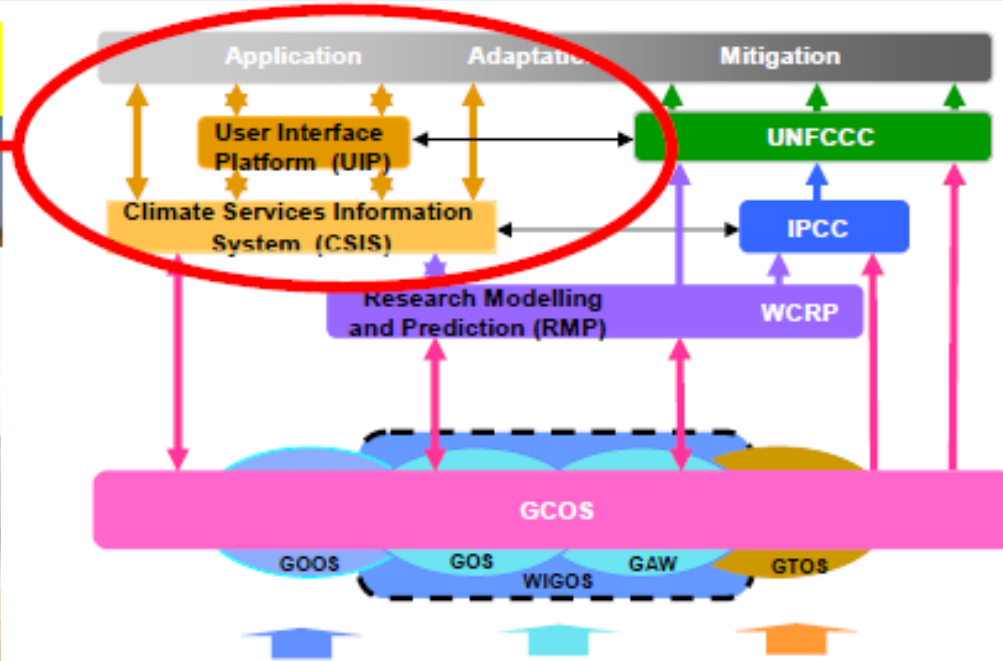
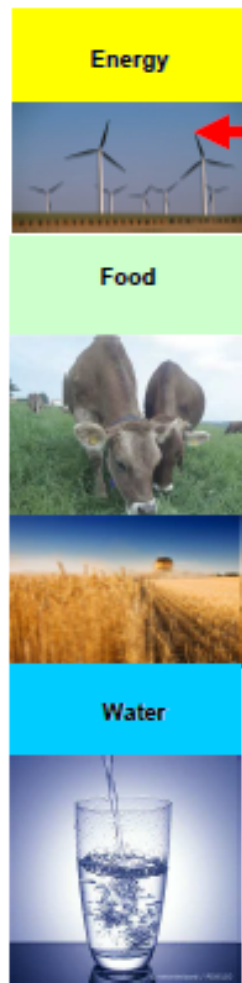
# GOFC Fire IT Meeting

GCOS Terrestrial Observing Panel for Climate (TOPC)

CEOS Land Product Validation

Kevin Tansey, University of Leicester

# GCOS supports the “Global Framework for Climate Services”



GCOS comprises the climate relevant components of existing observing systems.

GCOS ensures the sustained provision of reliable physical, chemical and biological observations and data records, across all domains, incl. hydrological and carbon cycles and the cryosphere.

ESSENTIAL CLIMATE VARIABLES		
OCEANIC	ATMOSPHERIC	TERRESTRIAL
<b>Surface (10)</b> Sea-surface temperature Sea-surface salinity Sea level Sea state Sea ice Surface current Ocean colour Carbon dioxide partial pressure Ocean acidity Phytoplankton	<b>Composition (3)</b> Carbon dioxide Methane and other long-lived greenhouse gases Ozone and Aerosol supported by their precursors	<b>Biological/Ecological (6)</b> Land cover FAPAR Leaf area index Above ground biomass Soil carbon Fire disturbance
<b>Sub-surface (8)</b> Temperature Salinity Current Nutrients Carbon dioxide partial pressure Ocean acidity Oxygen Tracers	<b>Upper-air (5)</b> Temperature Wind speed and direction Water vapour Cloud properties Earth radiation budget (including solar irradiance)	<b>Hydrological (5)</b> River discharge Water use Ground water Lakes Soil moisture
	<b>Surface (6)</b> Air temperature Wind speed and direction Water vapour Pressure Precipitation Surface radiation budget	<b>Cryospheric (4)</b> Snow cover Glaciers and ice caps Ice sheets Permafrost
		<b>Other (1)</b> Albedo



- A Panel within the GCOS Secretariat
- Provide scientific advice, feedback and contributions to GCOS documentation
  - Satellite supplement
- Monitors progress against actions identified in the Implementation Plan
- Discusses ECVs (existing and emerging)
- Discusses data centres (in-situ and satellite)
- Meets once per year

- Reports to Subsidiary Body for Scientific and Technological Advice (SBSTA) on Assessment of Adequacy and at the COP meetings
- Reported at the CEOS Plenary
  - Meeting with CEOS WG Climate in February 2013
- Report at the IPCC WG/Plenary for AR 5 meeting in Stockholm, September 2013

- 1998: First report on adequacy of global climate observation
  - responding to a request from COP to SBSTA in consultation with IPCC
- 2003: Second Adequacy Report
- 2004: Implementation Plan
  - identified required actions
- 2006: Satellite Supplement to Implementation Plan
  - identified products required from space-based observations

- 2009: Progress report
  - assessed progress on each of the actions in 2004 Implementation Plan
- 2010: Update of Implementation Plan
- 2010: UNFCCC/SBSTA invited GCOS
  - to report on progress and review adequacy, with timing to be considered later
- 2011: Update of Satellite Supplement to Implementation Plan

- 2012: UNFCCC/SBSTA invited GCOS to submit
  - a Third Adequacy Report to second 2015 session of SBSTA
  - a new Implementation Plan to second 2016 session, with draft encouraged to be provided one year before
    - verifiable and costed actions as previously
    - specific requirements for products (but maybe again through later supplement[s])
    - requirements for adaptation to variability and change, and for provision of services

# GCOS Continuous Improvement and Assessment Cycle

## Assessment on Progress & Adequacy 2015

Where are we now?  
Progress Report

### How to improve the system?

**New Networks**

**Research**  
WCRP, IGBP

**National Coordination**

**GCOS Cooperation Mechanism**

**Contributing Systems**

Global Terrestrial Observing System,  
Global Ocean Observing System,  
WMO Integrated Global Observing System,  
and others

What needs to be measured?

## New Implementation Plan 2016

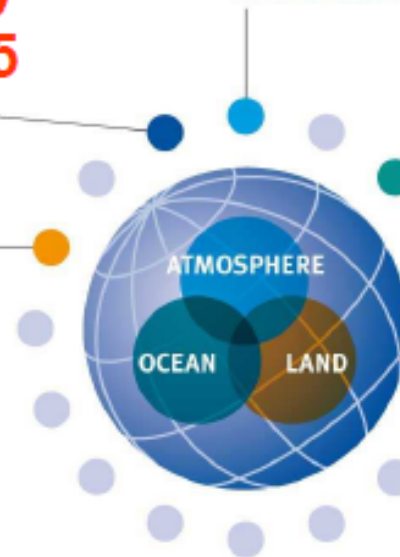
Essential Climate Monitoring Variables (ECVs)  
Implementation Plan

How to do it?

Climate Monitoring Principles  
Guidelines for Datasets and Products  
Regional Action Plans

By whom/by which means?

Space Agencies  
Network Owners  
Meteorological Service, Hydrological Service,  
Research Organizations, and other institutions  
Data and Analysis Centres





- Reviewing data needs for adaptation and service provision (2013)
- Assessing general progress and adequacy (2013-2015), taking account of
  - uncertainties identified by the IPCC Fifth Assessment process
  - Formulating new Implementation Plan (2015-2016)

- What is an AR?
  - What progress has been made in implementing climate observing networks and systems since the first report; and assess how well these current systems, together with new and emerging methods of observation, will meet the needs of the UNFCCC.
  - AR2 Report is an assessment of the ability of the climate observing system to meet the needs of the Parties to the Convention and the IPCC for climate observations at the global scale.
  - Actions <- Expert input <- evidence
  - GOFC-GOLD has interactions with climate modellers

- Content will be based on input from:
  - review of actions set out in 2010 IP
  - a recent Workshop on Observations for Adaptation to Climate Variability and Change
  - the fifth IPCC Assessment process, through workshop(s) that include participation of lead authors from WG1 and WG2 and other experts
  - 2014 National Communications to UNFCCC
  - panel chairs and panel members
  - writing-team meeting(s), consultations and public review
- Ensure that fire disturbance is strongly represented

- Strong progress against product development and validation (in US and Europe).
- Strong engagement with the climate research group of Martin Schultz, Philippe Ciais and their teams.
- The geoland2 product operationally delivering a > 14 year time-series of burned area data.
- VIRS/Landsat 8 successfully launched
- MODIS MCD64A1 500m burned area data now available since 2000.

- Continue the production of global burned area data sets from US and European satellites.
- GCOS Action Activity and update templates were put together by NOAA.
- Validation activities are progressing through NASA and ESA funded projects. There is some coordination of these activities.
  - Further development of automated classification techniques for Landsat-TM type data (Stroppiana et al.).
  - 260 validation data sets have been produced by the ESA CCI project.

- On active fires: Focus on attempting to improve the estimates of FRE/fuel consumption.
- There is also the development of an approaches to validate satellite FRP (of interest to CEOS LPV).
- Prototype active fire detection algorithm that exploits the high temporal resolution of geostationary data (SEVIRI):
  - increase the detection rate of low intensity fires
  - improve the characterisation of the fire pixel background brightness temperature estimates from which FRP is retrieved.

- Effort has also been concentrated on the improvement of FRE estimation under sparse observations. (Kumar et al.)
- R&D being undertaken on the use of constellations of small satellites for the detection of wildland fires. The constellation is proposed to use four small satellites of the BIRD/TET/BIROS class in low earth orbit. (Oertal et al.)

- GFED development continues strongly with recent developments focusing on:
  - Merging information from active fires with burned area which substantially boosts burned area and emissions
  - Emissions and the classification of emissions into deforestation, savanna, forest, agricultural and peat fires.
- Latest research has been on detection of small fire burned area that boosts global burned area and emissions by about 35% albeit with substantial uncertainty.



T35	Reanalyse the historical fire disturbance satellite data (1982 to present).
T36	Continue generation of consistent burnt area, active fire, and FRP products from low orbit satellites, including version inter-comparisons to allow unbiased, long-term record development.
T37	Develop and apply validation protocol to fire disturbance data.
T38	Make gridded burnt area, active fire, and FRP products available through links from a single International Data Portal.
T39	Develop set of active fire and FRP products from the global suite of operational geostationary satellites.

# Issues, Risks and Next Steps

- Reveal state of the art work on the active fire and FRP channels is needed, both on the documentation expected by GCOS, validation, continuity of observations and the coordination of data products.
- Need to ensure that CEOS WGCV & WGC and GOFC-GOLD are supported with information.

# Issues, risks and questions

- Prof. Riccardo Valentini has resigned as GTOS chair (uncertainty over ECV T13 status document update)
- Input provided when requested for TOPC meeting
- Rolling review of requirements is criticised
- Fire ECV workshop with Climate modellers and product developers in 2014 to feed into the next Adequacy Report and Implementation Plan
  - Active fire, burned area and FRP sessions
  - Review state of the art
  - Agree next key integrated actions

- Land Product Validation is a CEOS Working Group
- Interested in the publication of protocols to support the validation of land parameters/variables derived from satellite data
- Fire sub-group members are Luigi and myself
- The protocols are intended to support any community/scientific validation of global burned area data sets