GCOS Report to WGClimate-3

Jean-Louis Fellous
GCOS “Space Rapporteur”
• Retirement of Richard Thigpen (USA) (November 2012)
• Retirement of William Westermeyer (USA) (December 2012)
• Supporting the GCOS Expert Panels:
  – Programme Officer (AOPC, TOPC): Anna Mikalsen (Germany)
  – Programme Officer (OOPC): Katherine Hill (UK/Australia)
  – Junior Professional Officer: Jessica Holterhof (Germany)
• Space Rapporteur: Jean-Louis Fellous (France)
• Supporting the Observation & Adaptation Workshop:
  – Germany Secondment: Stefan Rösner (1 Oct 2012 – 31 March 2013)
  – US Secondment: Daniel Muller (11 Feb – 5 April 2013)
• Implementation Manager: Tim Oakley (UK)
• Director: Carolin Richter
• Admin. Assistant: Imelda DeChavez
Panel and SC Meetings 2013

- **Atmosphere (AOPC) and Land (TOPC)** Observing Panels will meet this year at WMO, Geneva
  - TOPC-15 (6-7 March 2013) includes WCRP representation
    - Handover TOPC chair from Han Dolman (NL) to Koni Steffen (CH)
    - TOPC-14 was attended by Joanne Nightingale, chair of WGCV/LPV
    - WGCV/LPV now formally invited as *ex officio* member of TOPC
  - AOPC-18 (2-5 April 2013) includes WCRP and CCI representation

- **Change in GOOS governance delayed** Ocean (OOPC) Panel meeting
  - GOOS will meet 25-27 March 2013, Qingdao, China (lead: Eric Lindstrom, USA, former OOPC Chair)
  - OOPC co-chairs designated: Marc Bourassa, USA, Toshio Suga, Japan
• Data and Products
  – WCRP Data Advisory Council, 2nd meeting, 4-5 March 2013 (EUMETSAT)

• CBS Lead Centres for GCOS
  – Meeting in Chile, 8-10 October 2013

• 21st GCOS Steering Committee
  – 14-18/21-25 October 2013, Offenbach, Germany
  – 2014 in China
Programme Activities 2013

• **ESA Climate Change Initiative**
  
  – Second Phase – decision on second set of GCOS ECVs
  
  • 29 ECVs can be observed by satellites;
  
  • 1st phase of CCI: 13 ECVs (Clouds, GHGs, Ozone, Aerosols, SST, SSL, Sea Ice, Ocean Colour, Glaciers and Ice Caps, Ice Sheets, Land Cover, Fire, Soil Moisture)
  
  – ESA Living Planet Symposium 9-13 September 2013, Edinburgh
  
  – 14 Sep ESA CCI, D/GCOS or SC Chair invited

• **CEOS** – Plenary 5-6 November 2013, Montreal
  
  – Working Group on Climate 20-21 February 2013
  
  • ECV Inventory – “where can you get the data?”

• **CGMS** – Plenary 11-2 July 2013, Tokyo
  
  – Ensure liaison with CEOS
  
  – EUMETSAT Conference 15-20 September 2013
Programme Activities (cont’d)

• **GEOSS and its SBA Climate**
  – Next Plenary and Ministerial Summit 13-17 January 2014, Geneva
  – GCOS to be considered as SBA Climate

• **UNFCCC - SBSTA**
  – GCOS to report on Assessment of Adequacy
  – Next SBSTAs in 3-14 June 2013 (research dialogue: ecosystems) and in November 2013 (observations: side events?)
  – Next COP-19 in Poland, Warsaw, 11-22 November 2013

• **WCRP - JSC**
  – 27-31 May 2013, Brasilia, Brazil
• **IPCC WG I Plenary for AR5**
  – Important input for GCOS assessment and new implementation plan
  – 23-26 September 2013, Stockholm
  – GCOS-SC Chair participated in the review process, as individual expert

• **Future Earth** – ICSU driven process
  – Observations need to be strengthened
  – Several working group meetings in 2013
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

New Implementation Plan 2016

What needs to be measured?
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

20-21 February 2013
CEOS WGClimate, WMO, Geneva
Next Steps

• **Next steps in assessment cycle**
  – reviewing data needs for adaptation and service provision (2013), linking with GFCS, UNEP and other initiatives
  – assessing general progress and adequacy (2013-2015), taking account of uncertainties identified by the IPCC Fifth Assessment process
  – formulating new Implementation Plan (2015-2016)

• **GFCS contribution**
  – GCOS / IOC / UNEP workshop on Observations and Adaptation
  – 26-28 February 2013, Offenbach, Germany

• **Future activities will be subject to the outcome of a Sponsors’ review of the programme to be held over coming 12 months**
  – Chairman: Wolfgang Kusch
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, including hydrological and carbon cycles and the cryosphere

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20-21 February 2013  
CEOS WGClimate, WMO, Geneva
### Time Table for Delivering the Adequacy/Progress Report and New IP

<table>
<thead>
<tr>
<th>Year</th>
<th>GCOS</th>
<th>UNFCCC</th>
<th>GFCS</th>
<th>IPCC</th>
<th>GEOSS</th>
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<tbody>
<tr>
<td>2012</td>
<td></td>
<td>SBSTA36 observations &amp; research dialogue</td>
<td>WMO Cg–ext (GFCS)</td>
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<tr>
<td>Q1</td>
<td>Q1</td>
<td>SC–20</td>
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<td>Plenary 9</td>
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<tr>
<td>Q2</td>
<td>Q2</td>
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<td>Monitoring and Evaluation SBA Climate</td>
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<td>Q3</td>
<td>Q3</td>
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<td>Plenary 10</td>
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<td>Q4</td>
<td>Q4</td>
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<tr>
<td>2013</td>
<td>Workshops on Observation &amp; Adaptation</td>
<td>SBSTA37/COP18 observations &amp; research (CEOS response)</td>
<td>GFCS implement activities</td>
<td>AR5 WG I approval of Report</td>
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<tr>
<td>Q1</td>
<td>SC–21</td>
<td>SBSTA38 research dialogue</td>
<td>Fast Track Projects</td>
<td>AR5 WG II and WG III approval of Report</td>
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<tr>
<td>Q2</td>
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<td>SBSTA39/COP19 observations</td>
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<td>AR5 Synthesis Report Delivered to COP20</td>
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<tr>
<td>Q3</td>
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<tr>
<td>Q4</td>
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<tr>
<td>2014</td>
<td>Workshops GCOS/IPCC WG I and II</td>
<td>SBSTA40 research</td>
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<td>Plenary 11</td>
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<td>Q1</td>
<td>SC–23</td>
<td>Adequacy/Progress draft available</td>
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<tr>
<td>Q2</td>
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<td>Q4</td>
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<tr>
<td>2015</td>
<td>Adequacy/Progress Final Report</td>
<td>SBSTA42</td>
<td>WMO Cg–XVII Congress Durban Platform</td>
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<td>Plenary 12</td>
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<tr>
<td>Q1</td>
<td>SC–23</td>
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<tr>
<td>Q2</td>
<td>Draft GCOS Impl. Plan</td>
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<tr>
<td>Q3</td>
<td>SC–23</td>
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<td>Q4</td>
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<td></td>
<td>Final IP Plan in 2016 to SBSTA45/COP22</td>
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Thank you for your attention!
Back up slides
4.3.1. Progress in implementing the Global Climate Observing System – unit [%]

- GCOS Implementation Plan recommends 143 tasks classified along the domains (A – O – T and cross-cutting)
  - action, responsible entities, time frame are clearly defined
  - performance indicators are given
  - annual costs implications are estimated
• Mapping and Visualisation of ECVs and networks contributing to GCOS
  – ESRI - Geographic Information System (GIS) software and geo-database management applications
  – Anna Mikalsen (GCOS) / Nils Hettich (SPACE) visited the ESRI Labs last autumn 2012
    • Further evolving the beta version
    • Investigating the purchase of licenses and support.
Report on progress made in observations

Compare GCOS Services

1980 Soil Moisture

Variable: Soil Moisture
Type: moisture [m3]
Year: 1980
Month: January
Colors: blue to Red

2010

Variable: Soil Moisture
Type: moisture [m3]
Year: 2010
Month: January
Colors: blue to Red
# Overview of atmospheric products

<table>
<thead>
<tr>
<th>ECV</th>
<th>Global Products</th>
<th>FCDR required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind Speed and Direction</td>
<td>Surface wind retrievals</td>
<td>MW, radar</td>
</tr>
<tr>
<td>Precipitation</td>
<td>Estimates (liquid &amp; solid)</td>
<td>MW, GEO VIS/NIR/IR</td>
</tr>
<tr>
<td>Upper-air Temperature</td>
<td>Temperature retrievals</td>
<td>MW, IR, Radio-occultation</td>
</tr>
<tr>
<td>Upper-air Winds</td>
<td>Upper-air wind retrievals</td>
<td>VIS/IR, Doppler Lidar</td>
</tr>
<tr>
<td>Water Vapor (Trop., strat.)</td>
<td>Total column, profiles</td>
<td>MW, UV, VIS, IR, limb</td>
</tr>
<tr>
<td>Cloud Properties</td>
<td>Amount, top P &amp; T, etc.</td>
<td>VIS/IR, IR/MW, lidar</td>
</tr>
<tr>
<td>Earth Radiation Budget</td>
<td>TOA/Surf. ERB, irradiance</td>
<td>BB radiance, solar irradiance</td>
</tr>
<tr>
<td>CO₂, CH₄ and other GHGs</td>
<td>GHG retrievals (regional)</td>
<td>NIR/IR</td>
</tr>
<tr>
<td>Ozone</td>
<td>Total column, profiles</td>
<td>UV/VIS/IR/MW, nadir/limb</td>
</tr>
<tr>
<td>Aerosol Properties</td>
<td>Optical depth, albedo, etc.</td>
<td>UV/VIS/NIR/SWIR/TIR, limb sounding, lidar profiling</td>
</tr>
<tr>
<td>Precursors of O₃ &amp; Aerosols</td>
<td>Retrievals of precursors, e.g. NO₂, SO₂, HCHO &amp; CO</td>
<td>UV/VIS/NIR/SWIR/TIR, limb sounding, lidar profiling</td>
</tr>
</tbody>
</table>
## Overview of oceanic products

<table>
<thead>
<tr>
<th>ECV</th>
<th>Global Products</th>
<th>FCDR required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea-surface Temperature</td>
<td>Integrated SST analyses based on satellite and <em>in situ</em> data records</td>
<td>IR, MW</td>
</tr>
<tr>
<td>Sea-surface Salinity</td>
<td>Datasets for research on sea-surface salinity</td>
<td>MW</td>
</tr>
<tr>
<td>Sea Level</td>
<td>Sea level global mean and regional variability</td>
<td>Altimetry</td>
</tr>
<tr>
<td>Sea State</td>
<td>Wave height, other measures of sea</td>
<td>Altimetry</td>
</tr>
<tr>
<td>Sea Ice</td>
<td>Sea-ice concentration, extent, edge, supported by thickness &amp; drift</td>
<td>MW, VIS, radar, lidar, SAR altimetry</td>
</tr>
<tr>
<td>Ocean color</td>
<td>Ocean radiometry, Chl-a</td>
<td>Multispectral VIS imagery</td>
</tr>
</tbody>
</table>
## Overview of terrestrial products

<table>
<thead>
<tr>
<th>ECV</th>
<th>Global Products</th>
<th>FCDR required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lakes</td>
<td>Lake levels, areas</td>
<td>VIS/NIR, radar</td>
</tr>
<tr>
<td>Snow Cover</td>
<td>Snow areal extent, SWE</td>
<td>VIS/NIR/IR, passive MW</td>
</tr>
<tr>
<td>Glaciers and Ice Caps</td>
<td>2D vector outlines, DEM</td>
<td>VIS/NIR/IR, InSAR, stereo</td>
</tr>
<tr>
<td>Ice Sheets</td>
<td>Elevation changes</td>
<td>Altimetry, SAR, gravity</td>
</tr>
<tr>
<td>Albedo</td>
<td>BRDF</td>
<td>Multispectral radiances</td>
</tr>
<tr>
<td>Land Cover</td>
<td>Moderate/High res. maps</td>
<td>VIS/NIR, radar</td>
</tr>
<tr>
<td>FAPAR</td>
<td>Maps</td>
<td>VIS/NIR</td>
</tr>
<tr>
<td>LAI</td>
<td>Maps</td>
<td>VIS/NIR</td>
</tr>
<tr>
<td>Biomass (Forest)</td>
<td>Regional, above ground</td>
<td>Radar, lidar</td>
</tr>
<tr>
<td>Fire Disturbance</td>
<td>Maps, burnt areas/active</td>
<td>VIS/NIR/SWIR/IR</td>
</tr>
<tr>
<td>Soil Moisture</td>
<td>Maps</td>
<td>Active &amp; passive MW</td>
</tr>
<tr>
<td>(Land surface Temperature)</td>
<td>Temperature records</td>
<td>IR from GEO, MW from LEO</td>
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</tbody>
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