Development of a GEO Global Water Quality Monitoring and Forecasting Service

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International Ocean Colour Science Meeting June 2015
The Group on Earth Observation (GEO)

To realize a future wherein decisions and actions, for the benefit of humankind, are informed by coordinated, comprehensive and sustained Earth observations and information.

Relevant Facts:

• Launch in response to 2002 World Summit on Sustainable Development
• Voluntary partnership: ~96 nations and ~89 international organizations
• The GEO community is creating a Global Earth Observation System of Systems (GEOSS) that will link Earth observation resources world-wide
• Coordinated by the Group on Earth Observations (GEO) which implements the GEOSS work plan through the best efforts of its community
• Provide framework to develop new projects and coordinate strategies
GeO Inland and Coastal Water Quality Working Group
A component of WA-01: Water Task Work Plan

- C1 Integrated Water-cycle Products and Services
- C2 Information Systems for Hydro-meteorological Extremes (incl. Floods and Droughts)
- C3 Information Service for Cold Regions
- C4 Global Water Quality Products and Services
- C5 Information System Development and Capacity Building
Overall GEO WQ Task Goal: Develop, implement and maintain a global inland and coastal water quality monitoring and forecasting service. This task will be facilitated by a newly implemented GEO Water Quality (GEO-WaQ) Community of Practice.

C4 Global Water Quality Products and Services

Over 100 members in WQ working group
Define specific requirements of the water quality system components and develop a plan to implement an integrated end-to-end water quality monitoring and forecasting service.
Develop a.) Strategic implementation and b.) a phased action plan including baseline (goal, ample funding) and threshold (funding constrained) service build-outs, with both a short-term (0-5 year) build-out plan for pilot/prototype regional service(s) and a long-term (6-10 year) plan for a global-scale water quality monitoring and forecasting service.

Image courtesy of Maryland Sea Grant
GEO Water Quality Summit Deliverables

Develop a.) Strategic implementation and b.) a phased action plan including baseline (goal, ample funding) and threshold (funding constrained) service build-outs, with both a short-term (0-5 year) build-out plan for pilot/prototype regional service(s) and a long-term (6-10 year) plan for a global-scale water quality monitoring and forecasting service.

Formation of a GEO Water Quality (GEO-WaQ) Community of Practice bringing together relevant data providers and users who will work collaboratively to implement, utilize, maintain and enhance the regional (initially) and (ultimately) global water quality monitoring and forecasting service.
Summit Progression

- Background and Group Charge
- End User Needs
- Data
- Products and Indicators
- Information
- Knowledge
Summit Progression

Breakout Sessions

Background and Group Charge
End User Needs
Data
Products and Indicators
Information
Knowledge
Background and Group Charge
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Strategic Implementation Plan
Phased Action Plan
• **Goal**: established a multi-stream multi-scale WQ monitoring service serving multiple users and providing a baseline set of consistent products for all users and a framework for the development of further products, indicator and knowledge

• Recognition that there are aspects of WQ monitoring that are “mature” enough for sustained/operational production – The time is now!
A suggested “target” for an initial global “Core” Service could be the first baseline assessment for the water quality in the UN Sustainable Development Goals (SDG) process. This would raise visibility and provide “global” justification to the effort.

The sustained global core WQ service should be complimented by distinct end-to-end demonstration for specific WQ sectors/users at the regional/local scale. Successful pilots could receive some type of GEO branding.
Research and the Science Community:
The emphasis on advancing a sustained/operational and end-user driven pilots shouldn’t take away from the acknowledged need for continued research in advancing the state-of-the-art. The WQ CoP should provide periodic 2-yearly documents presenting pressing research needs to advance WQ monitoring, to present through GEO to member and other funding entities.
The GEO WQ Action Plan

- The phased action plan includes:
  - baseline (goal, ample funding) and
  - threshold (funding constrained)
  - service build-outs, with both a short-term (0-5 year) build-out plan for pilot/prototype regional service(s)
  - and a long-term (6-10 year) plan for a global-scale water quality monitoring and forecasting service.
- The building blocks of the action plan are milestones
## Critical Milestones

<table>
<thead>
<tr>
<th>What (MS Description)</th>
<th>When</th>
<th>Success measures</th>
<th>Actions required to achieve it</th>
<th>Responsible person/organisation</th>
<th>Comments</th>
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**Milestone #1:**

- **What:**
  - baseline:
  - threshold:
- **When:**
- **Measures of success:**
- **Action 1.1:**
  - **What:**
  - **Who:**
  - **When:**
- **Action 1.2:**
- ...
<table>
<thead>
<tr>
<th>What (MS Description)</th>
<th>When</th>
<th>Success measures</th>
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<tbody>
<tr>
<td>1 global product available</td>
<td>Apr 16</td>
<td>Data product QC‘ed, documented and out on the Web</td>
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<tr>
<td>Proposal for a inland WQ ECV ready</td>
<td>July 15</td>
<td>White paper submitted to TOPC</td>
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<td>White paper to NRC</td>
<td>Oct 15</td>
<td>White paper submitted to NRC</td>
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<tr>
<td>Catalogue (meta data) about existing services</td>
<td>Jun 17</td>
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<tr>
<td>Demonstration of a linked System of Systems</td>
<td>Jun 17</td>
<td>(1) Technical link of regional systems</td>
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<td>(2) Link of data source (needs rephrasing)</td>
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<tr>
<td>User Work Plan agreed and published</td>
<td>Apr 16</td>
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<td>Working Group on def. of global products: publication draft ready for submission</td>
<td>Jun 16</td>
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<td>Report on Interactions with UN organisations</td>
<td>Dec 17</td>
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<td>WQ Group improved recognition at GEO</td>
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<td>(1) Formally accepted as CoP</td>
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<td>(2) WQ proposed as a Flagship</td>
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<td>Preliminary suite of global WQ products implemented (indicators, Sentinels, VIIRS)</td>
<td>Apr 20</td>
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<tr>
<td>Transition from regional to global system, knowledge transfer progress report</td>
<td>Apr 20</td>
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<tr>
<td>WQ CoP Secretariat and work plan in place</td>
<td>Apr 16</td>
<td>Regular progress reports of the WQ CoP</td>
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Groupings of milestones into “Work Packages”

WP 1. Community of Practice organization and function
WP 2. Data and Information Inventories (“meta” tasks) supporting CoP
WP 3. Development of Global baseline WQ product(s)
WP 4. Local/Regional end-to-end service demonstration, development and integration
## List of milestones for WP2

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<td><strong>WP 2 Data and Information Inventories</strong></td>
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<td>WP 2.1 Draft and maintain a WQ research agenda ¹</td>
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<td>WP 2.2 Catalogue (meta data) about existing services ²</td>
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<td>WP 2.3 GEO WQ web portal/web services</td>
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<td>WP 2.4 User requirements engagement</td>
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<td>April</td>
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¹ *This should be a periodic output e.g. every 2-3 yr*

² *should also include past and present research projects i.e. a curated knowledge base*
List of milestones for WP2

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<td>WP 2 Crosscutting / “meta” efforts supporting CoP</td>
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1. This should be a periodic output e.g. every 2-3 yr

2. should also include past and present research projects i.e. a curated knowledge base
WP 2.1 worksheet

- **What:** Draft and maintain a WQ research agenda
  - baseline:
  - threshold:
- **When:** review every 2 years
- **Measures of success:**
- **Action 2.1.1:** Formulate research requirements
  - **What:** currently identified research topics:
    - protocols harmonisation
    - Algorithms ...
  - **Who:**
  - **When:**
- **Action 2.1.2:** Lobby for R&D activities on modelling and forecasting through EO data assimilation; link to GODAE (coastal)
  - **What:**
  - **Who:**
  - **When:**
- **Action 2.1.3:**
  - **What:**
  - **Who:**
Near-term Next Steps

April 2015
- GEO Summit
- Initial draft of implementation and action plans

May 2015
- 1st Follow-up telecon
- Review of summit and plan draft documents

June 2015
- Draft report of summit
- Refine list of milestones and timeline

July 2015
- Assign leads for completion of milestone sheets

August 2015
- Leads reach out to WQ community. Initiate milestone actions
Visit our website:
http://www.geo-water-quality.org/home

Thank You