A collaborative project aimed at pre-validation of a GMES Global Water Scarcity Information Service
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GLOWASIS general info

January 2011 – December 2012
Project budget 3 M EUR

List of participants:

<table>
<thead>
<tr>
<th>Participant no.</th>
<th>Participant organisation name (short name)</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Coordinator)</td>
<td>Stichting Deltares (Deltares)</td>
<td>Netherlands</td>
</tr>
<tr>
<td>2</td>
<td>Consiglio Nazionale delle Ricerche (CNR)</td>
<td>Italy</td>
</tr>
<tr>
<td>3</td>
<td>European Centre for Medium-Range Weather Forecasts (ECMWF)</td>
<td>United Kingdom</td>
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<td>4</td>
<td>Commission of the European Communities Directorate General Joint Research Centre (JRC)</td>
<td>EU</td>
</tr>
<tr>
<td>5</td>
<td>Netherlands Geomatics and Earth Observation B.V. (NEO)</td>
<td>Netherlands</td>
</tr>
<tr>
<td>6</td>
<td>Universiteit Utrecht (UU)</td>
<td>Netherlands</td>
</tr>
<tr>
<td>7</td>
<td>Technische Universitaet Wien (TU Wien)</td>
<td>Austria</td>
</tr>
<tr>
<td>8</td>
<td>Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (TNO)</td>
<td>Netherlands</td>
</tr>
<tr>
<td>9</td>
<td>Universidade de Santiago de Compostela (UCS)</td>
<td>Spain</td>
</tr>
<tr>
<td>10</td>
<td>Instytut Meteorologii i Gospodarki Wodnej (IMGW)</td>
<td>Poland</td>
</tr>
<tr>
<td>11</td>
<td>University of KwaZulu Natal (UKZN)</td>
<td>South Africa</td>
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Project Overview

SUMMARY

GLOWASS will be a dedicated water scarcity information portal where governmental and statistical water demand data are combined with standardized in-situ and satellite data and hydrological forecasting models.

OBJECTIVES

In three pilot studies, a one-stop-shop portal must strengthen the manager’s water scarcity countermeasures with additional EO and in-situ data. This results in three pillars of R&D goals:

- User requirements
- IT interoperability
- Additional capabilities
A collaborative project aimed at pre-validation of a GMES Global Water Scarcity Information Service “do not re-invent the wheel”

- Eurostat
- AQUASTAT
- LANDSAF LAI/FAPAR
- LANDSAF SC
- LANDSAF ET
- Geoland 2
- MODIS
- My Ocean
- CryoSAT2
- River and Lake
- Sentinel
- SMOS
- AMSR-E
- Water Table
- ESA DUE
- EFI
- CMORPH
- TRMM

= existing

= research

End user systems

European Drought Observatory

PCR/GLOBWB

26-Jan-2012
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European Drought Observatory

Short/medium term (7-15 days) forecast of

- Soil moisture
- Precipitation
- Vegetation parameters

5 x 5 km gridcells

GLOWASIS will calculate the added value of remotely sensed data for Europe and Africa
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PCR-GLOBWB
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WATER SCARCITY vs DROUGHT

When the water demand outstrips the supply
Historical Trends

- Global water demand more than doubled during the period 1960-2000

<table>
<thead>
<tr>
<th></th>
<th>1960</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
<td>57</td>
<td>199</td>
</tr>
<tr>
<td>Industry</td>
<td>116</td>
<td>257</td>
</tr>
<tr>
<td>Livestock</td>
<td>10</td>
<td>16</td>
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<tr>
<td>Irrigation</td>
<td>645</td>
<td>1376</td>
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GLOBAL WATER SCARCITY INDICES

May 1960

WSI
Water Stress Indicator, Falkenmark, 1989
Total net water demand/water availability
Net demand: gross demand - return flows

May 1980

May 2001
- Sharp increase in irrigation and domestic water demand from 1960 to 2001 in Kerala, India.
- Human water use intensified water stress by nearly 200%.
- Water stress is in a rising trend.

**Water Stress Indicator**

![Kerala, India](image)

**Historical trends**

- WD Years
- WD 1960

(WD: Water Demand)
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**Historical trends**

- Water demand (WD) quintupled from 1960 to 2001 in Romania.

- Agriculture: 60%, Industry: 30% and Households: 10%, respectively.

- High water stress since 1980s has been anthropogenically driven rather than climate induced.

**Water Stress Indicator**

<table>
<thead>
<tr>
<th>WD Years</th>
<th>WD 1960</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>1993</td>
</tr>
</tbody>
</table>

WD: Water Demand
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Where do we want to be in 2012?

A popular INSPIRE proof portal that is used many times by many users

Make sure users can really use the data and not only look at it

Show the complexity of water scarcity research

Sharing free data is the key to succes
  - Use open standards
    - Data: NetCDF
    - Server: OPeNDAP
    - Viewer(s): WMS
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Vision in all workpackages

Open standards and (if possible) open source
What will be on the data portal?

Open data (so everyone can view and download the data)

- Demonstrator outputs
  - Water Scarcity forecasts
  - 1960-2000 climatology water scarcity model output datasets
  - Global Groundwater Table
  - Global hydrological seasonal forecasts (discharge)
  - Global meteorological seasonal forecasts (precipitation, 2m temp)

- 2000 – 2010 case study outputs
  - Water Scarcity forecasts (hindcast)
  - Global hydrological forecasts (hindcast, discharge)
  - Improved satellite data sets:
    - Rainfall (snowfall)
    - Soil moisture
    - Snowcover

- Other?
  - Long term views on population and climate wrt drought?
  - ...
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End goal

• A portal showing a popular water scarcity map on main page. Historical, current and forecast
• (only quantity, not quality)

• Clicking will bring you to
• Full data portal
• EDO and other portals

• NOTE: viewing and downloading

Example full data portal. Source: adaguc.knmi.nl
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- A portal showing a popular water scarcity map on main page. Historical, current and forecast
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Example full data portal. Source: adaguc.knmi.nl
The water table is shallow in many areas. It will modulate soil moisture dynamics and possibly land-surface fluxes there.

In some of those areas recharge is not very large, groundwater withdrawals for irrigation or other uses can cause a significant depression of the water table.
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Improved Temporal Coverage (2007)

(a) AMSR-E (passive)

(b) ASCAT (active)
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International In-Situ Soil Moisture Network (GEWEX)
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Explain the complexity of water scarcity

User-science-policy interface

- Translating to user-friendly results;
- Popular portal;
- Daily Water Scarcity and Drought News;

- Information on existing drought indices

- Policy briefs (identify gaps of knowledge for EC)

- Stakeholder consultation
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GLOWASIS makes use of GMES CORE services Land and Ocean from MyOcean and GeoLand2

GLOWASIS makes use of various amounts of NASA data

GLOWASIS plays a role in the joint drought-flooding-water scarcity forecasting platform within the new Group on Earth Observation 2012 Work Plan, DS-05-D5, Information Systems for Hydrological and Meteorological Extremes.