OpenEarth

Dr.ir. Gerben J. de Boer
– TU Delft / Van Oord

2012

De Nederlandse Dataprijs gaat dit jaar naar Political Mashup (Dataprijs humaniora en sociale wetenschappen) en OpenEarth (Dataprijs exacte en technische wetenschappen).

De prijswinnaars vnr: Maarten Marx (Political Mashup) en Thijs Damsma, Gerben de Boer en Mark van Koningsveld (OpenEarth) – Foto: Bart van Vliet

OpenEarth is een open source initiatief dat data, modellen en gereedschappen in waterbouw wil delen. Een flink deel van het budget van waterbouwkundige en kustverdedigingsprojecten gaat naar het vergaren en het beheren van data over

Symposium Connecting data for research - 19 October 2015
2nd round of break-out sessions - *Session 1: Working with GIS-data*

TU Delft

Deltares
Enabling Delta Life

Van Oord
Marine ingenuity

What is OpenEarth

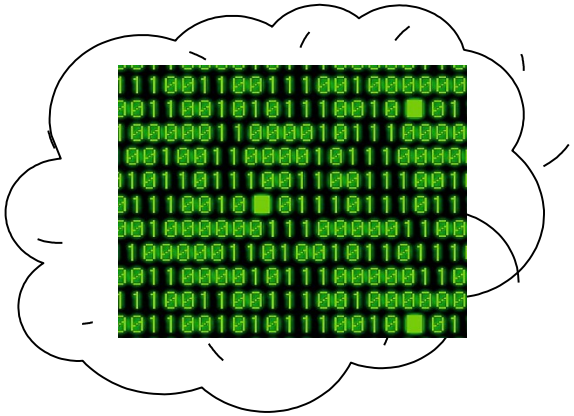
2008

- Make **existing** data, models and tools available
  - in crease efficieny of projects
  - prevent double work
  - prevent loss of previous work
    - > due to lack of archiving (no time to store)
    - > due to new bugs (no time to test)
  - make work nicer: less maintenance, more development

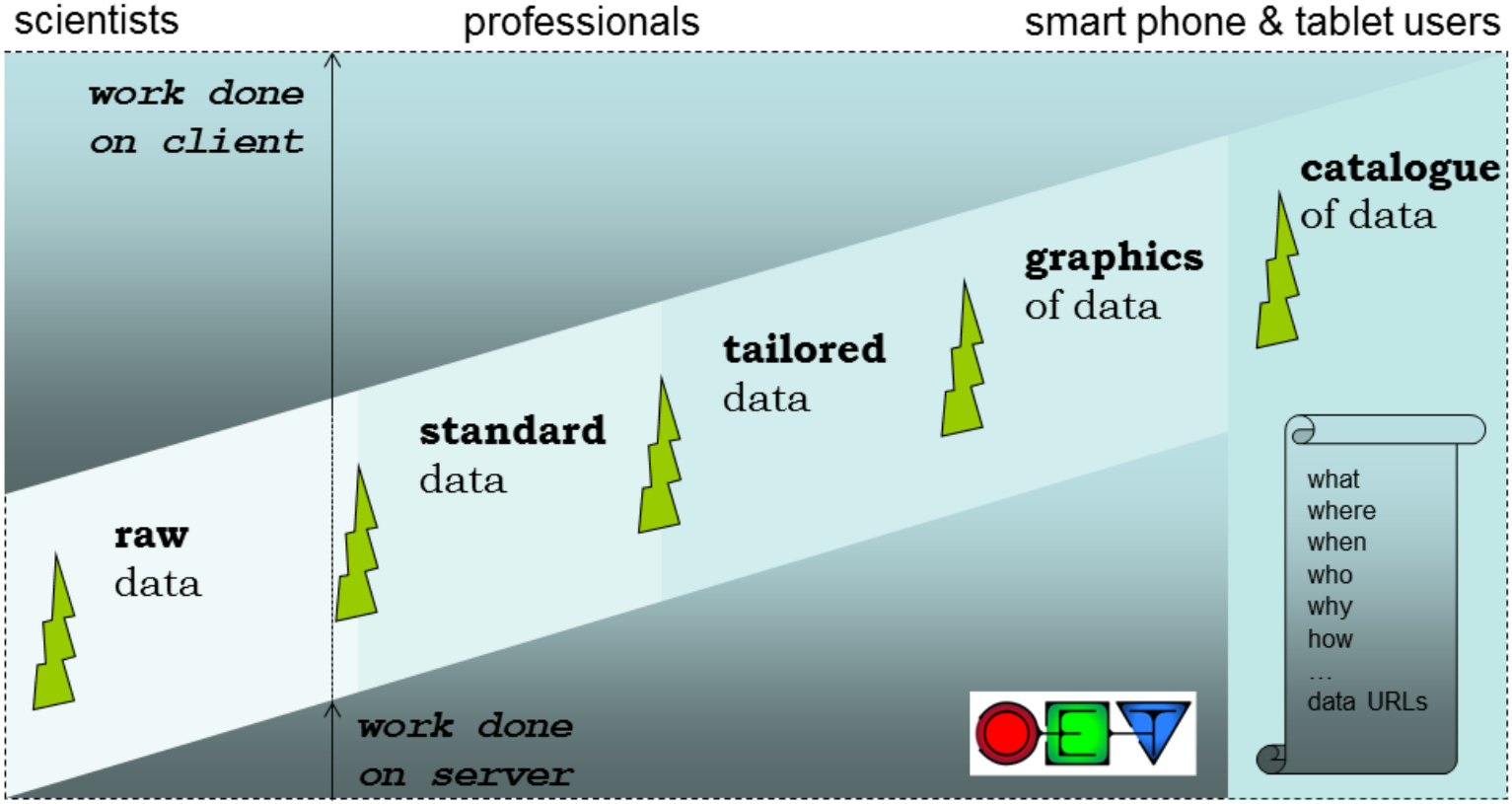
- **a data and source code repository**
- **a community**
  a repository is useless without people using it
- **a philosophy**
  a community is useless without collaboration: **cooperate!**

Deltares

Repository: ***web-based*** standards



Different layers of standard inspired by Tim Berners-Lee:
5 ★
Open Data



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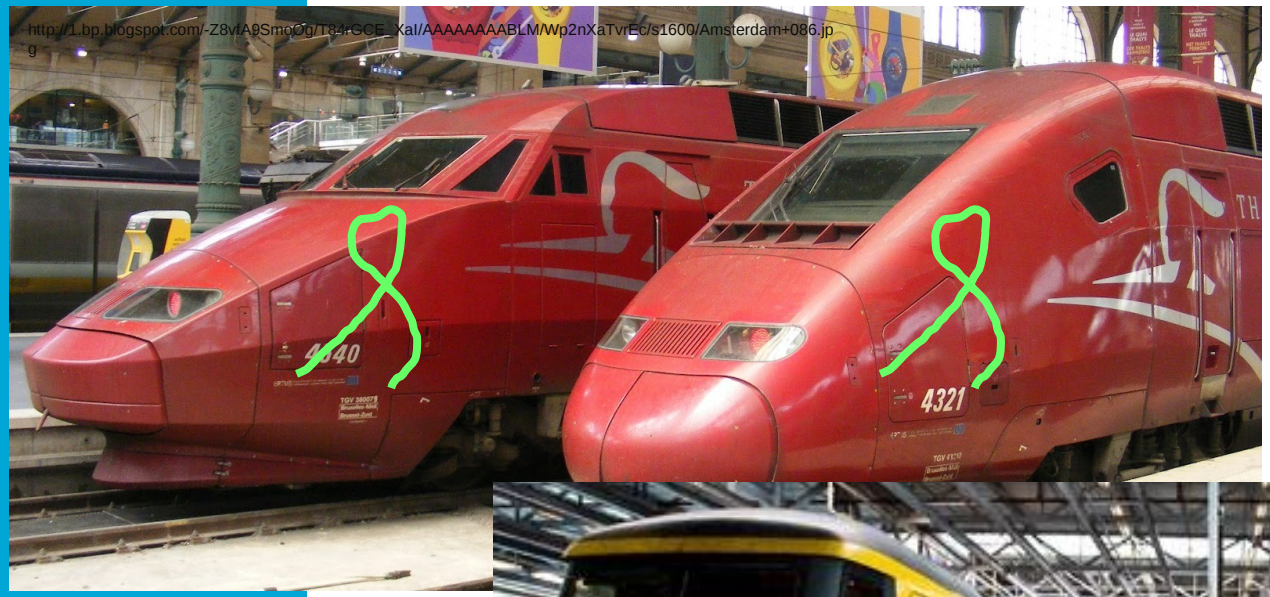
Repository: ***proven*** standards

not too new



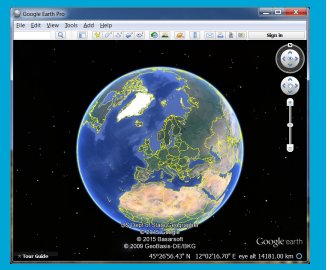
Use proven and existing technology, avoid being guinee pig for too new standards. Standards mature only after using them (like ERTMS).

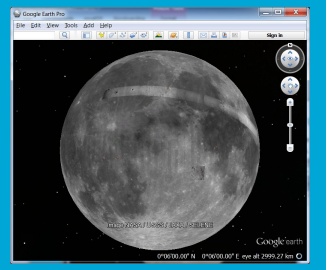
Repository: ***current*** standards

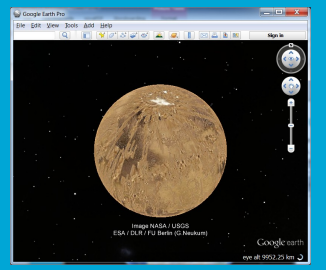
not too old

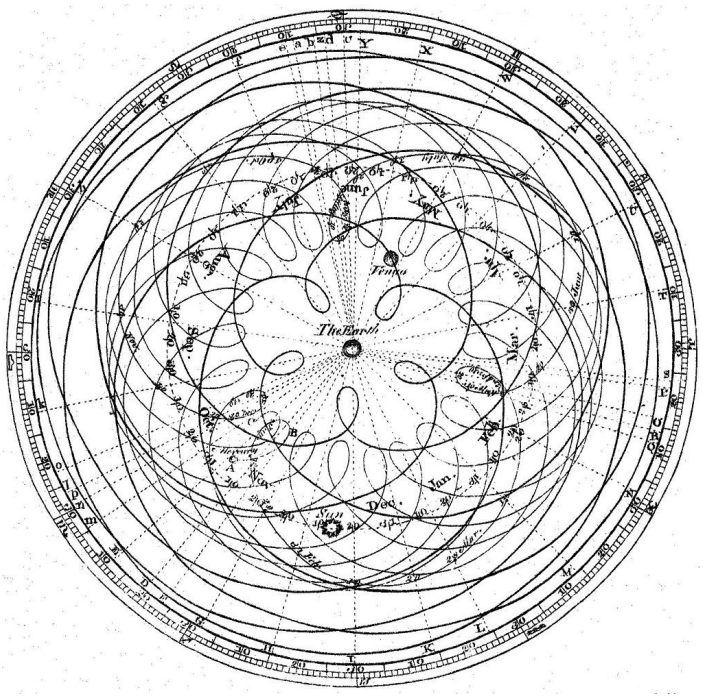
Google Earth overtook all GIS sciences and standards with Google Maps and open 3D kml: use only GPS WGS84. And UTC for times.

Google Earth can handle multiple planets. Now that's useful meta-data.

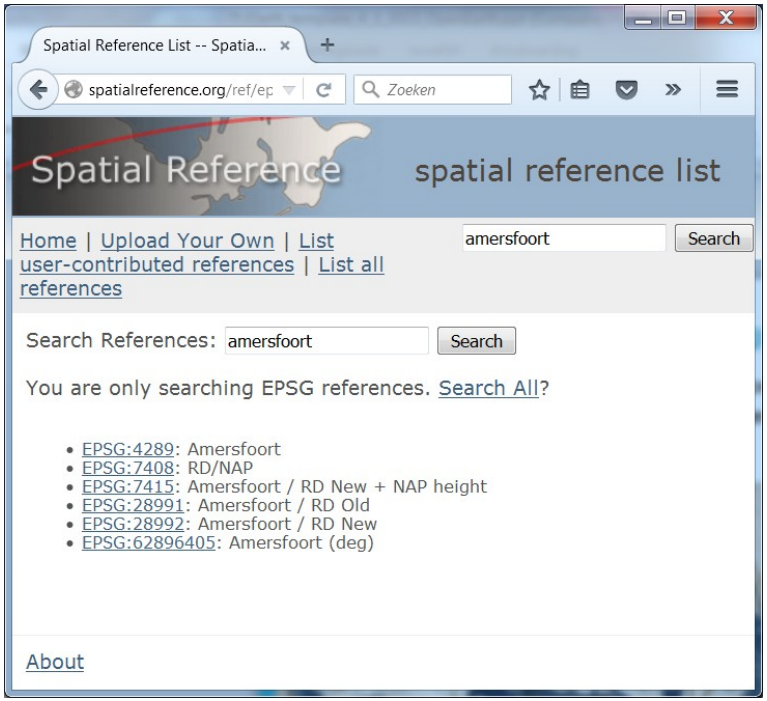








Enormous complexity of earth-centered system became simple with sun-centered one. Occams' razor at best.

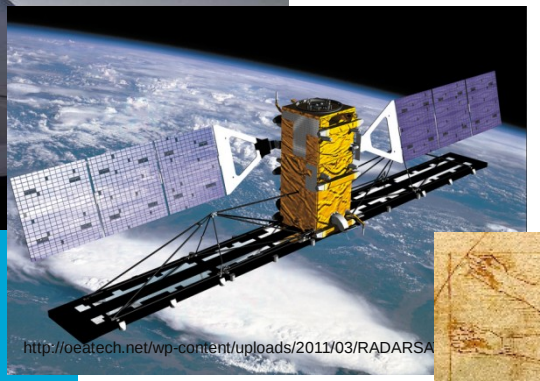


2015: list of 5 ways to map NL. Which one to choose ? None, use GPS + WGS84. The Earth is round !

Community: as large as possible


http://nupedailynews.com/wp-content/uploads/2013/01/telescope.jpg

SPACE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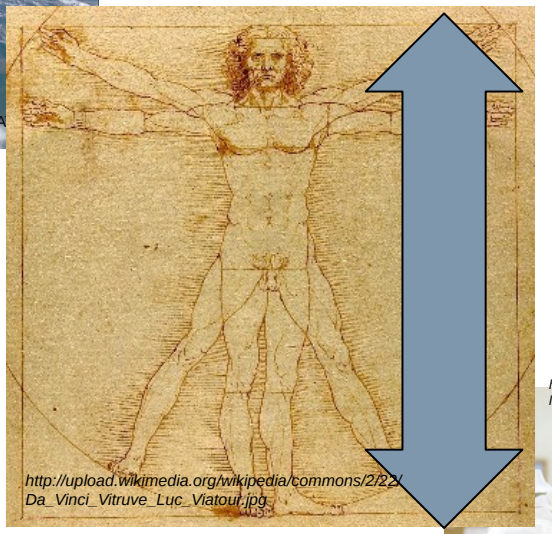
Marine/coastal scales

6400 km:
North Atlantic
Oscillation (NAO)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gap 10^{-6} > 10^{+6}

Water scarcity
Flood protection
Water pollution


http://chromblog.thermoscientific.com/Portals/49739/images/
lims for biobanking1.png

CERN

suspended
mud particle
64 µm

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Deltares
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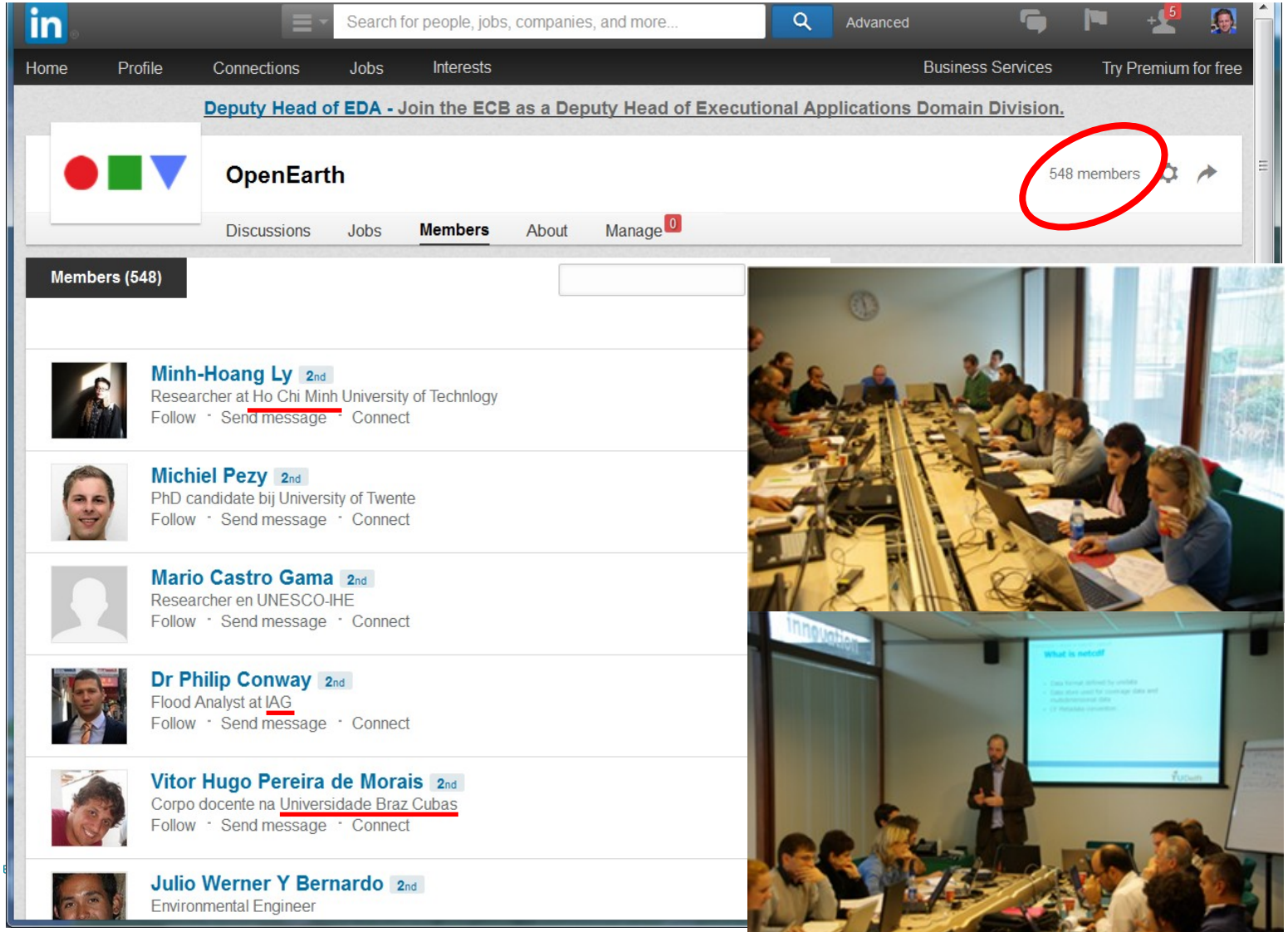
Van Oord
Marine ingenuity

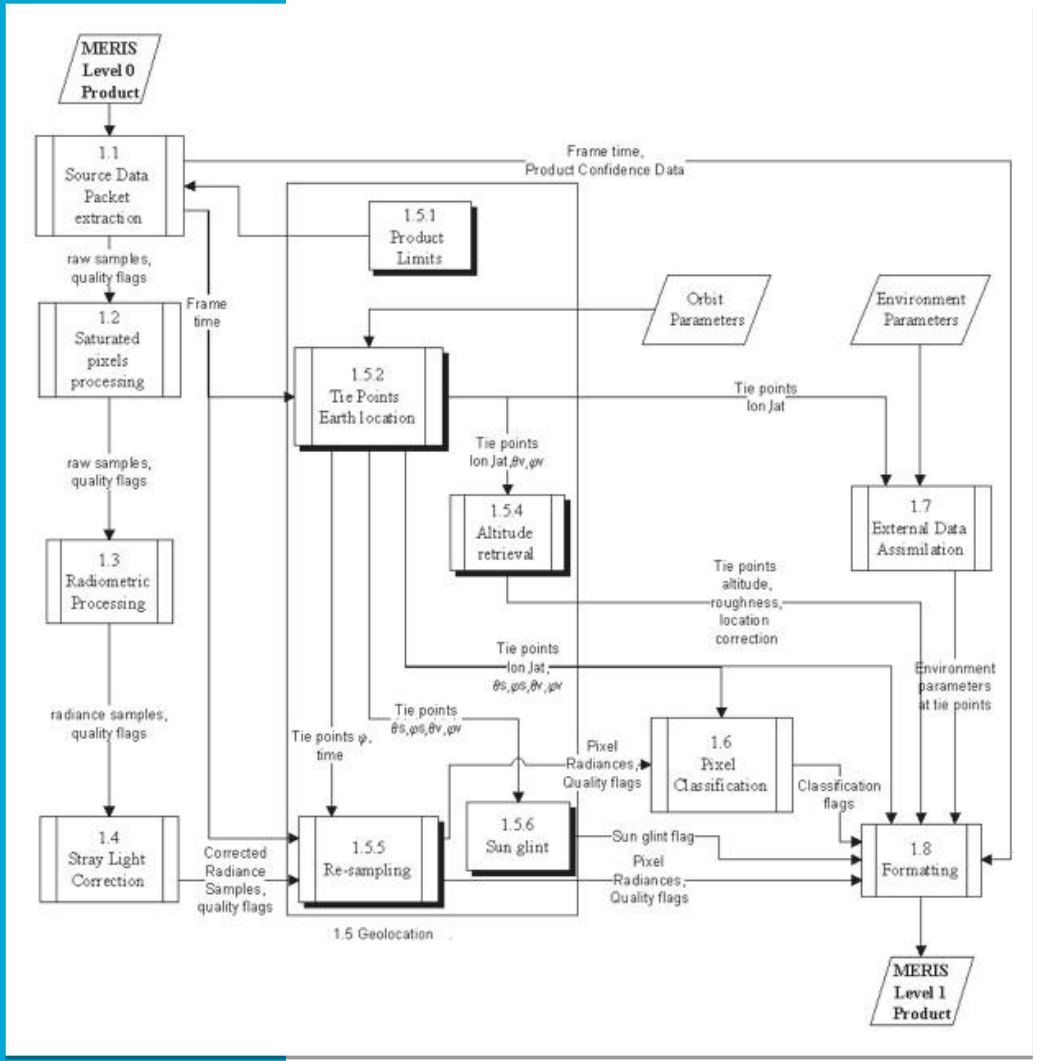
2 former PhD students just started OpenEarth by combining their finished work: **Mark van Koningsveld** (UT: coastal sand) & **Gerben de Boer** (TUD: marine mud)

Social network has grown to **500+ users**, incl 3rd world + Fortune 500.

Community: *social media events/training*



Philosophy: data = raw data + **tools**



Real data sharing implies:

- Raw data sharing
- Software sharing

Earth observation (NASA, ESA, NOAA): L1..L4 = f (L0, g)

- L0 data = raw sensor data
- L1..L4 = interpretation levels
- f = open source software
- g = ancillary data (weather)

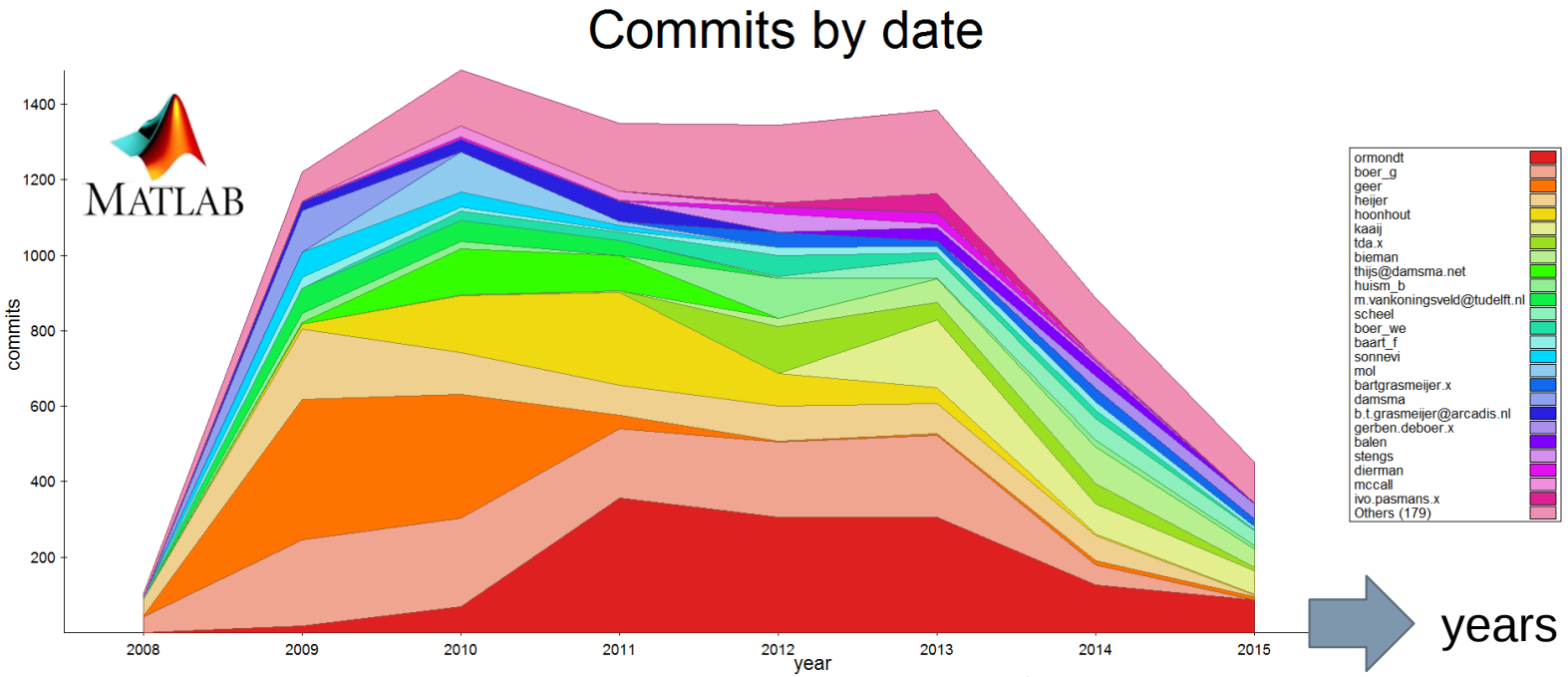
Amazon

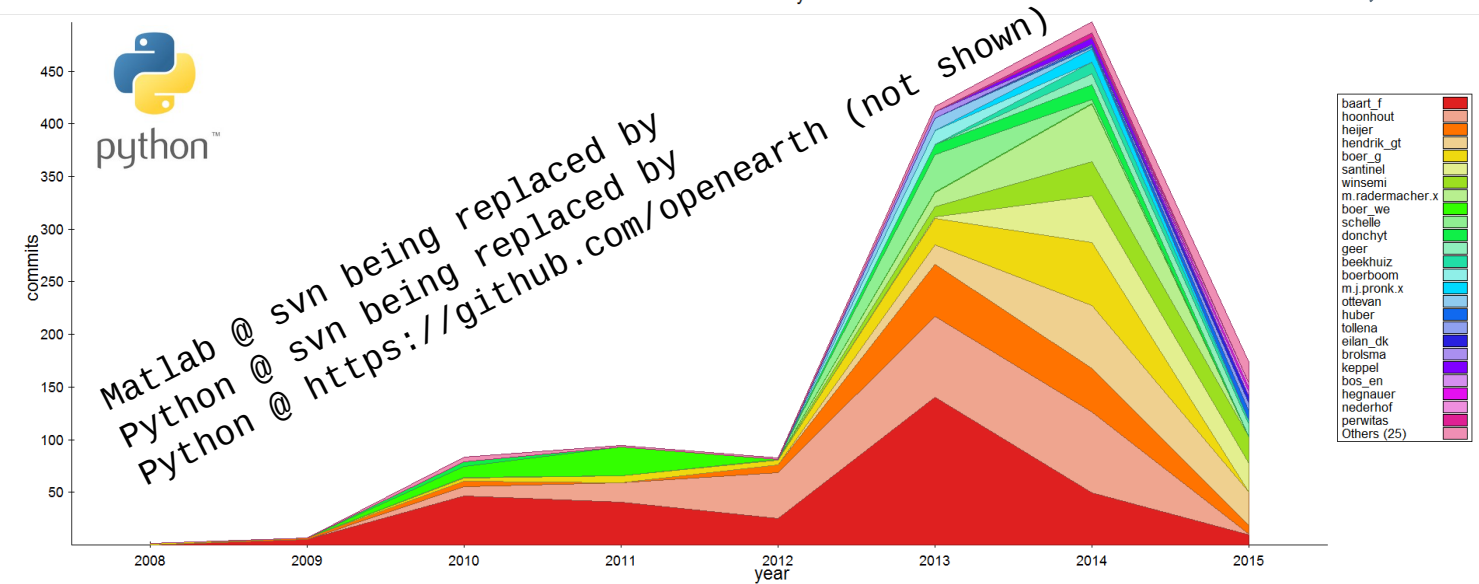
Philosophy: version control

http://www.knups.nl/leuk_plaatje/56/Helaas_pindakaas.html

Source code repository has **800+ users** and 250+ contributors.

Philosophy: shared tool





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logos ethos > PATHOS

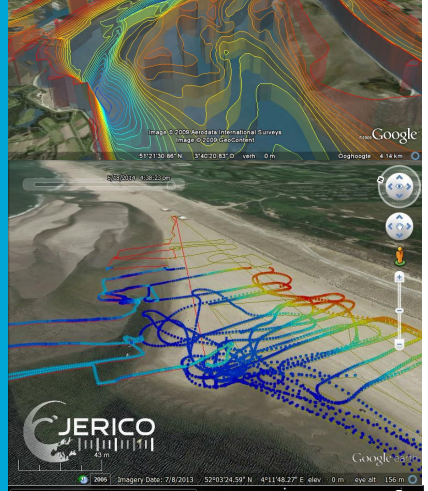
raw
data

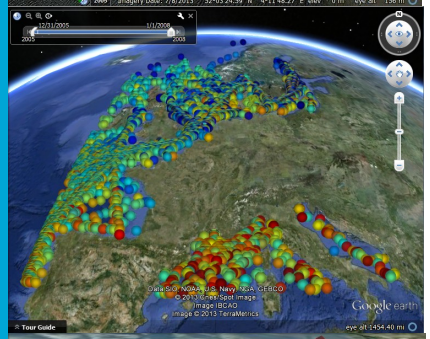
scripts

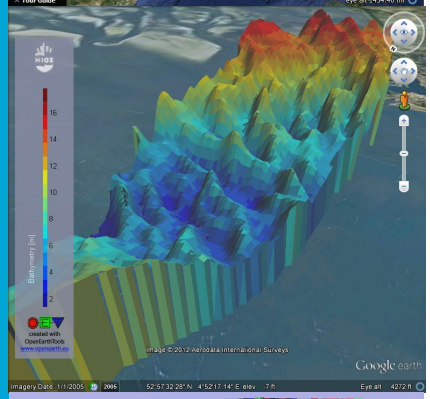
under version control

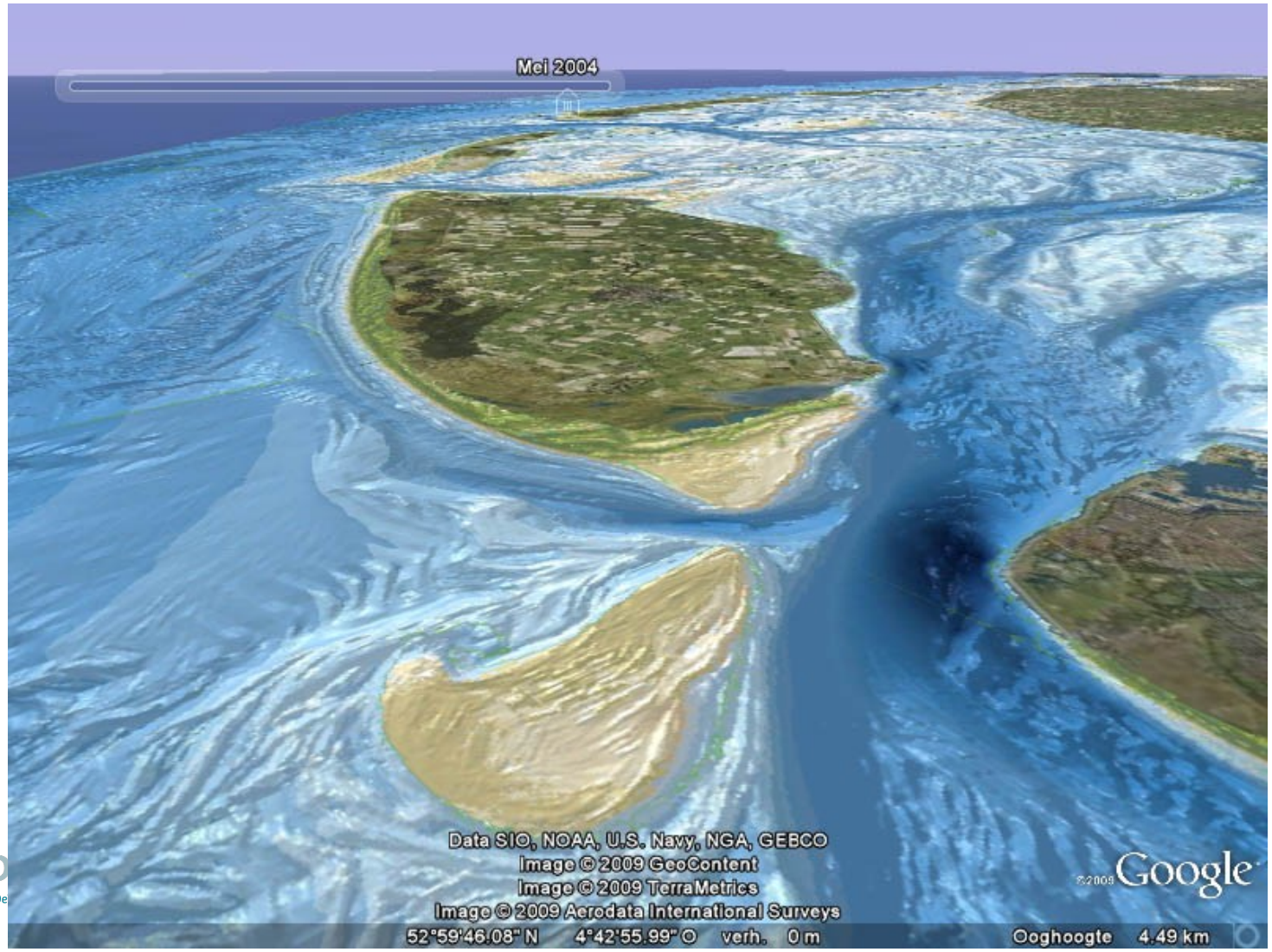
tailored
data

logos ethos > PATHOS: graphics









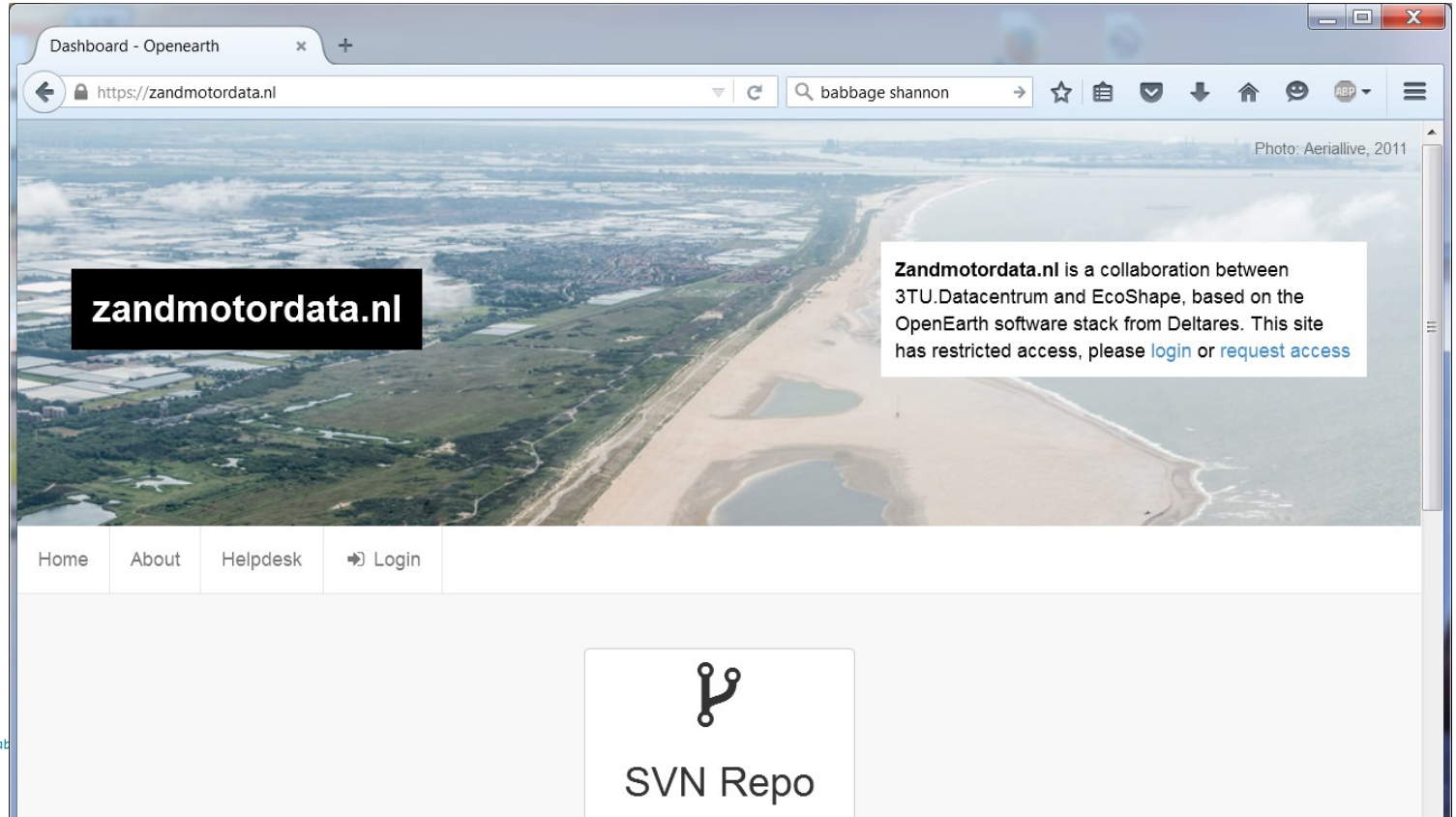
Organizational embedding

Deltares hosts OpenEarth tools + data repositories:

- *Synergy with open source model communities Delft3D, XBeach*

3TU.Datacentrum hosts Zandmotor: paid during embargo, free after

- *Synergy with catalogues, DOI etc.*



Spin-off: Van Oord

OpenEarth: A Knowledge Management Workflow for Dredging Projects 3

M. VAN KONINGSVELD, T. DAMSMA, R. VAN DER HOUT, J. VAN WIECHEN AND G. DE BOER

OPENEARTH: A KNOWLEDGE MANAGEMENT WORKFLOW FOR DREDGING PROJECTS

ABSTRACT

Research and consultancy as well as construction projects often spend a significant part of their budget to set up some basic infrastructure for data and knowledge management, most of which dissipates again once the project is finished. Standing initiatives so far have not been successful in providing a proper data and knowledge management system for data, models and tools. OpenEarth (www.openearth.eu) was developed as a free and open source alternative to the current often ad-hoc approaches to deal with data, models and tools.

OpenEarth as a whole (philosophy, user community, infrastructure and workflow) is the first comprehensive approach to handling data, models and tools that actually works in hydraulic engineering practice at a truly significant scale. It is implemented effectively not only at its original founding organisations, Delft University of Technology and Deltares, but also in a number of sizeable research programmes with multiple partners (such as research programme "Building with Nature" with 19 partners from one country) and from multiple countries (such as the 3-year European Union FP7 research programme MICORE with 15 partners from 9 countries). It has been adopted as the main data management workflow for all research programmes around the Sand Engine Delfland and was awarded the Dutch Data Prize 2012 for technical sciences by 3TU.datacentrum, the data archiving institute of the Dutch technical universities, and DANS, the data archiving institute of the Dutch National Science Foundation (NWO) and the Royal Dutch Academy of Sciences (KNAW).

For data, models and tools that are truly strategic and really cannot be shared, OpenEarth stimulates the set-up of internal OpenEarth clones. This way the OpenEarth workflow can still be adopted, promoting collaboration within an organisation, while taking care of security considerations at the same time.

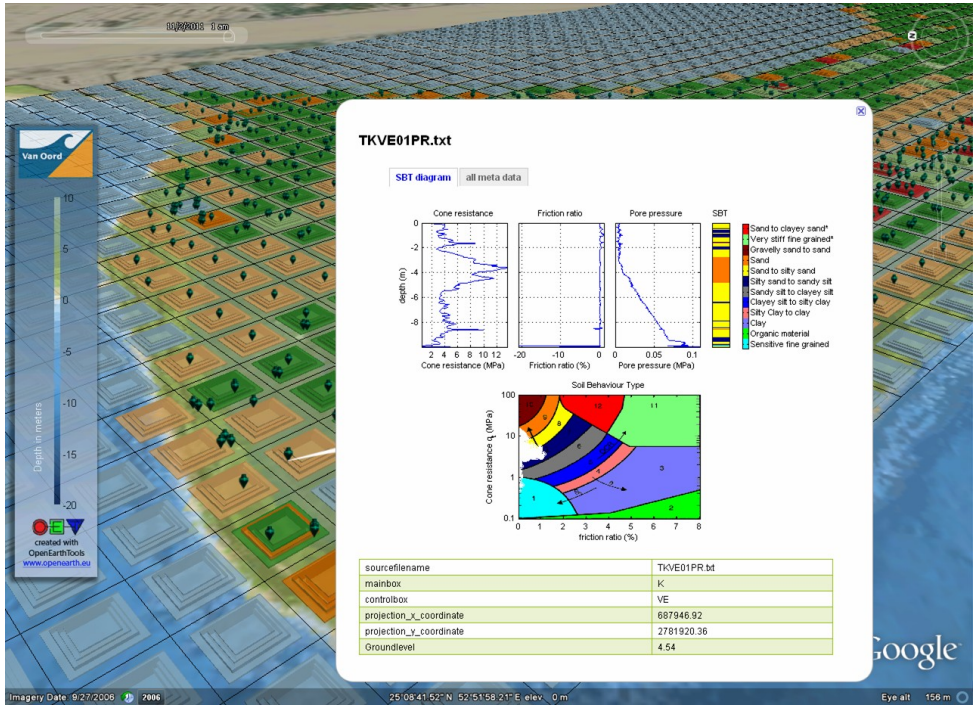
This article is based on and updates the OpenEarth philosophy, infrastructure and main workflow protocols as presented at WODCON XIX in Beijing, China (Van Koningsveld *et al.*, 2010). A number of practical example applications that have been realised to date are given to illustrate OpenEarth's potential for the dredging industry.

Above: OpenEarth (www.openearth.eu) was developed as a free and open source alternative to the current often ad-hoc approaches to deal with data, models and tools, adopting two existing web services that are fully operational with a large community of users, **OPeNDAP** protocol for accessing data numbers and **Google Earth KML** standard for accessing data graphics.

INTRODUCTION

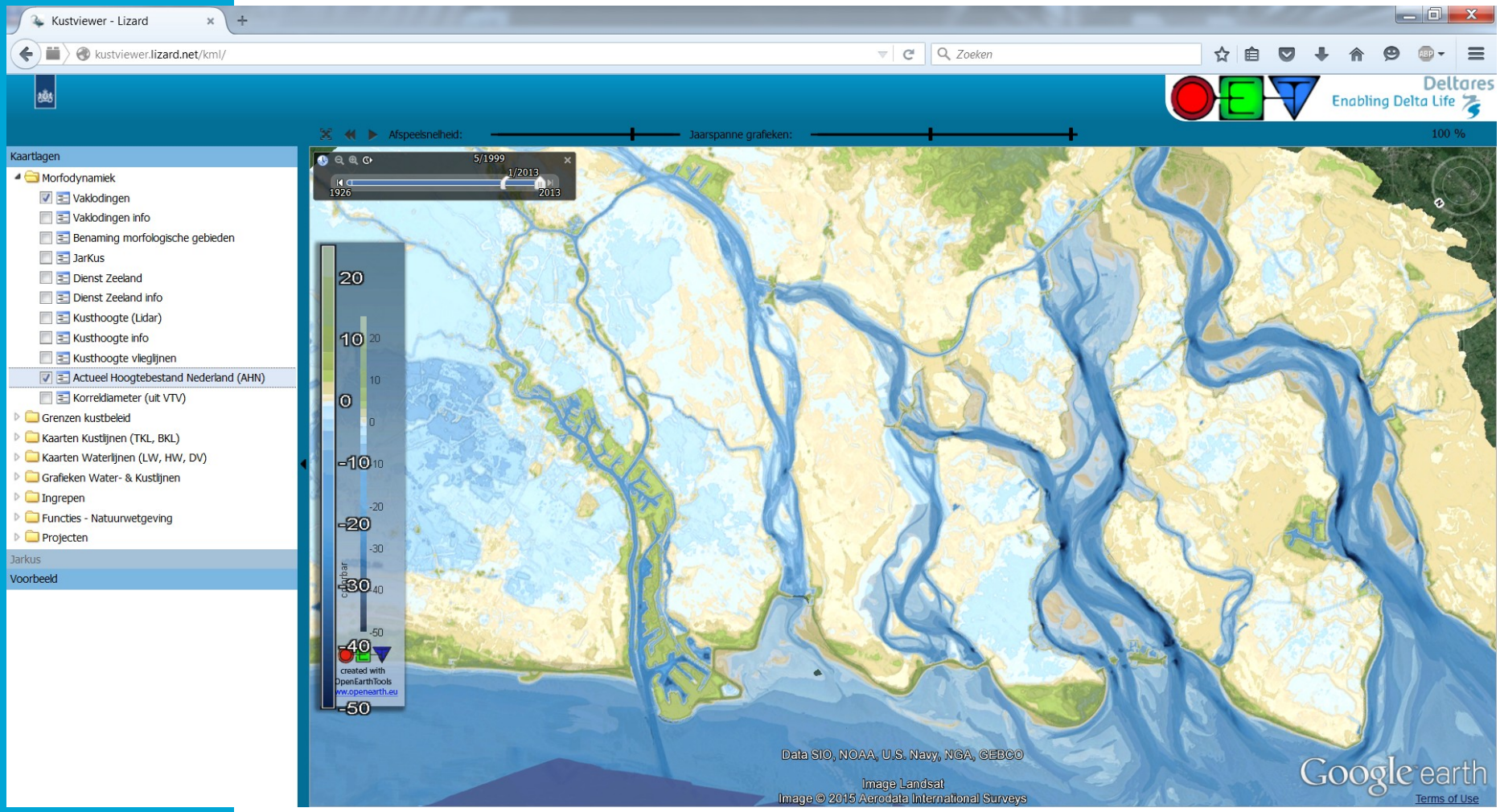
The sustainable interaction between humankind and planet Earth poses huge hydraulic and environmental engineering challenges. Confronting these challenges one-project-at-a-time, while seemingly attractive from a budget management perspective, results in grave inefficiencies in developing and archiving the basic elements that are invariably involved: data, models and tools. Hardly any project is by itself of sufficient scale to develop easily accessible and high-quality data archives, state-of-the-art modelling systems and well-tested analysis tools under version control. Research, consultancy as well as major construction projects commonly spend a significant part of their budgets to set up some basic data and knowledge management infrastructure, most of which dissipates again once the project is finished.

Internally institutions generally employ intranet services and internal networks to collaborate and exchange information. However, owing to increasing complexity, large projects nowadays are regularly executed by consortia.



Van Oord: Engineering & Estimating
OpenEarth Data Management.

Spin-off: Rijkswaterstaat



http://kustviewer.lizard.net/

Rijkswaterstaat: Kustlijnzorg Programma

TU Delft

Deltares Enabling Delta Life

Van Oord Marine ingenuity

More information

www.openearth.nl

datacentrum.3tu.nl

www.zandmotordata.nl

kustviewer.lizard.net