How to exploit data

(accessible through standard interfaces)

Torill Hamre, Øystein Godøy

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Topics

- Interfaces to data
- Integration in e.g Python, R, Jupyter
- Benefits of standardisation
  - Interfaces
  - Formats
  - Metadata structures

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Interfaces to data

- NorDataNet (and other infrastructures) offer standard interfaces to data, through e.g. OPeNDAP
  - Metadata
    - Dataset Attribute Structure (DAS)
    - Dataset Descriptor Structure (DDS)
  - Data
    - Values (DataDDS)

- Other standards supported: OGC WxS, HTTP, FTP,

- Benefits
  - Same tool can access data from multiple providers
  - Many open source tools and libraries available that support these standards
  - Online tutorials for writing your own tools

Interfaces to data

- Benefits of OPeNDAP
  - Allows reading data as a stream
  - Subsetting (extract a part of the dataset)

- Easy to integrate into e.g.
  - R
  - Python
  - Matlab
  - Ferret (https://ferretop.pmel.noaa.gov/Ferret/)
  - Excel
    - Check e.g. NETCDF4Excel on GitHub (http://netcdf4excel.github.io/)

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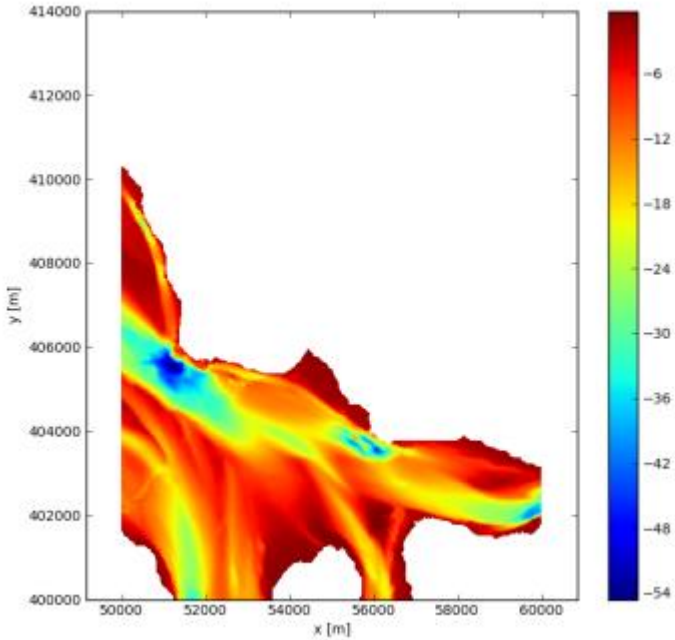
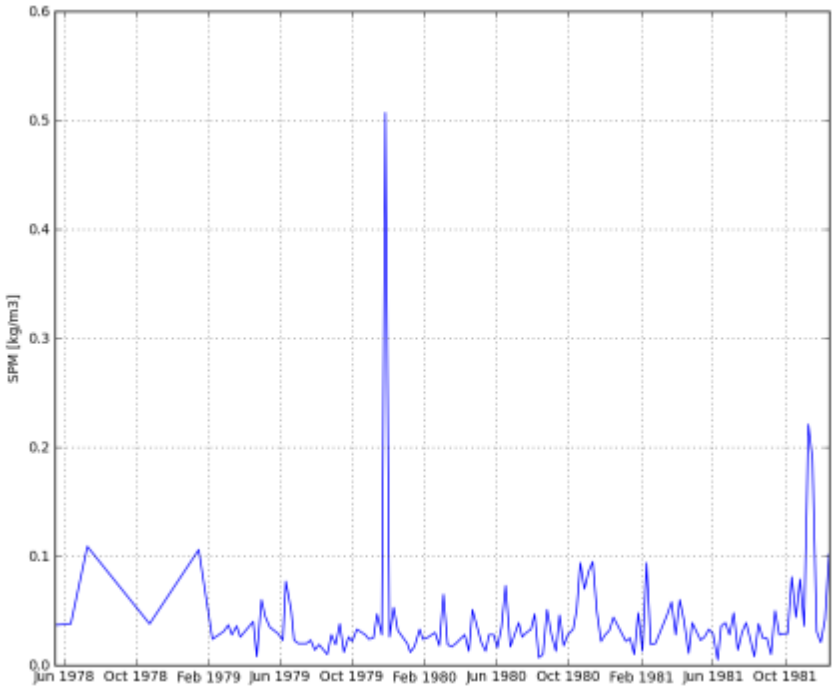
Integration in R, Python,…

- OPeNDAP access with python
  https://publicwiki.deltares.nl/display/OET/OPeNDAP+access+with+python
  - Install needed packages (PythonXY, NetCDF4 package, pydap, …)
  - Follow the tutorial

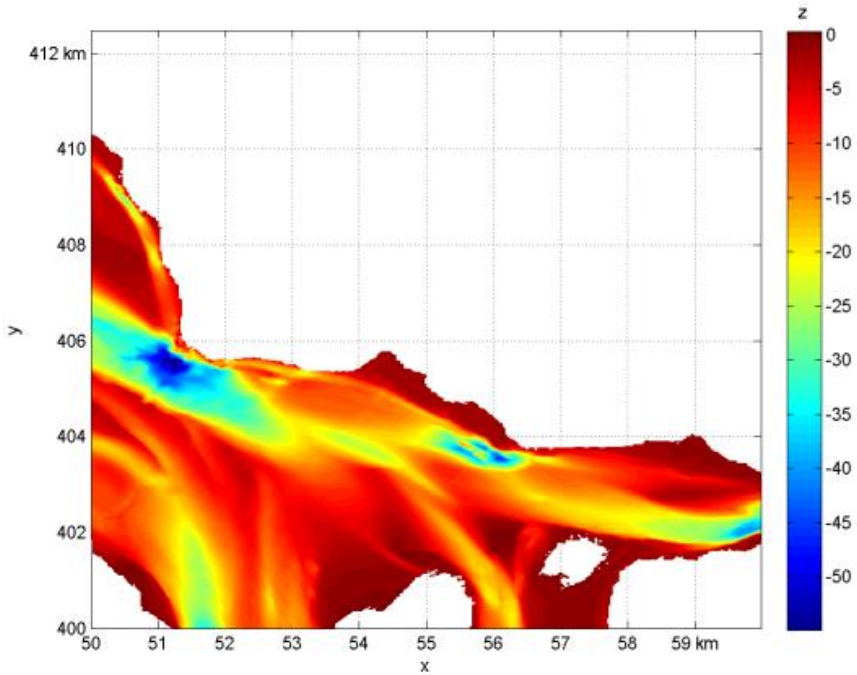


Map of suspended matter in water



Integration in R, Python,…

- OPeNDAP access with Matlab
  https://publicwiki.deltares.nl/display/OET/OPeNDAP+access+with+Matlab
  - Install needed packages (snctools (part of OpenEarthTools))
  - Follow the tutorial



Map of suspended matter in water

Integration in R, Python,…

- Some resources to try out
  - OPeNDAP access with R
    https://publicwiki.deltares.nl/display/OET/OPeNDAP+access+with+R
  - OPeNDAP subsetting with R
    https://publicwiki.deltares.nl/display/OET/OPeNDAP+subsetting+with+R
  - OPeNDAP access with python
    https://publicwiki.deltares.nl/display/OET/OPeNDAP+access+with+python
  - OPeNDAP access with Matlab
    https://publicwiki.deltares.nl/display/OET/OPeNDAP+access+with+Matlab
  - OPeNDAP access with Excel
    https://publicwiki.deltares.nl/display/OET/OPeNDAP+access+with+Excel

Integration in R, Python,…

- Some resources to try out
  - Jupyter - OPeNDAP Access in Python to Derive Climate Normals and Anomalies of Daymet netCDF4 Yearly Data
    - https://github.com/ornldaac/daymet-normals-anomalies-years
  - Jupyter Notebook Tutorial: Introduction, Setup, and Walkthrough
    - https://www.youtube.com/watch?v=HW29067qVWk

Benefits of standardisation

- Interfaces
  - You will know how to connect to data sources
  - Will find (lots of) tools/libraries that you can utilise
  - Large community behind protocols like OPeNDAP, OGC WMS/WFS/WCS
- Formats
  - Documentation (usually comprehensible and readable)
  - Supported by many PLs, tools, libraries
  - You will find many online examples
- Metadata structures
  - Documents data so you can reuse it, and know what you are working with!
  - All of the above

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