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WIGOS & OSCAR

… Where Observational Requirements Meet Observational Capabilities

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Acknowledgment: Financial support from Swiss Federal Department of Foreign Affairs (FDFA), The United Nations and International Organisations Division (UNIOD)

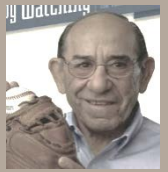
Outline

- WIGOS
- WIGOS metadata standard and exchange format(s)
- OSCAR/Surface
- Outlook

WIGOS

“If you don't know where you are going, you'll end up someplace else.”

— Yogi Berra



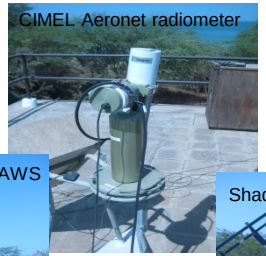
WIGOS (WMO Integrated Global Observing System)

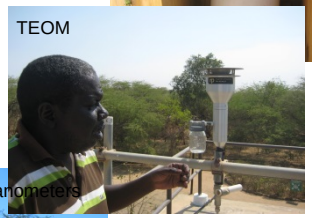
- A governance framework for WMO and co-sponsored observing systems, surface-based and space-based
- A strategy to do more with less
- An information resource

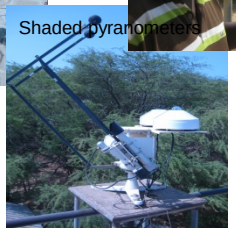
How to do more with less?

- Specify requirements
- Document existing cababilities
- Identify gaps
- Collaborate and integrate
  - Identify partners
  - Eliminate unnecessary redundancies
  - Automate
  - Streamline data operations

Example: Mbour, Senegal



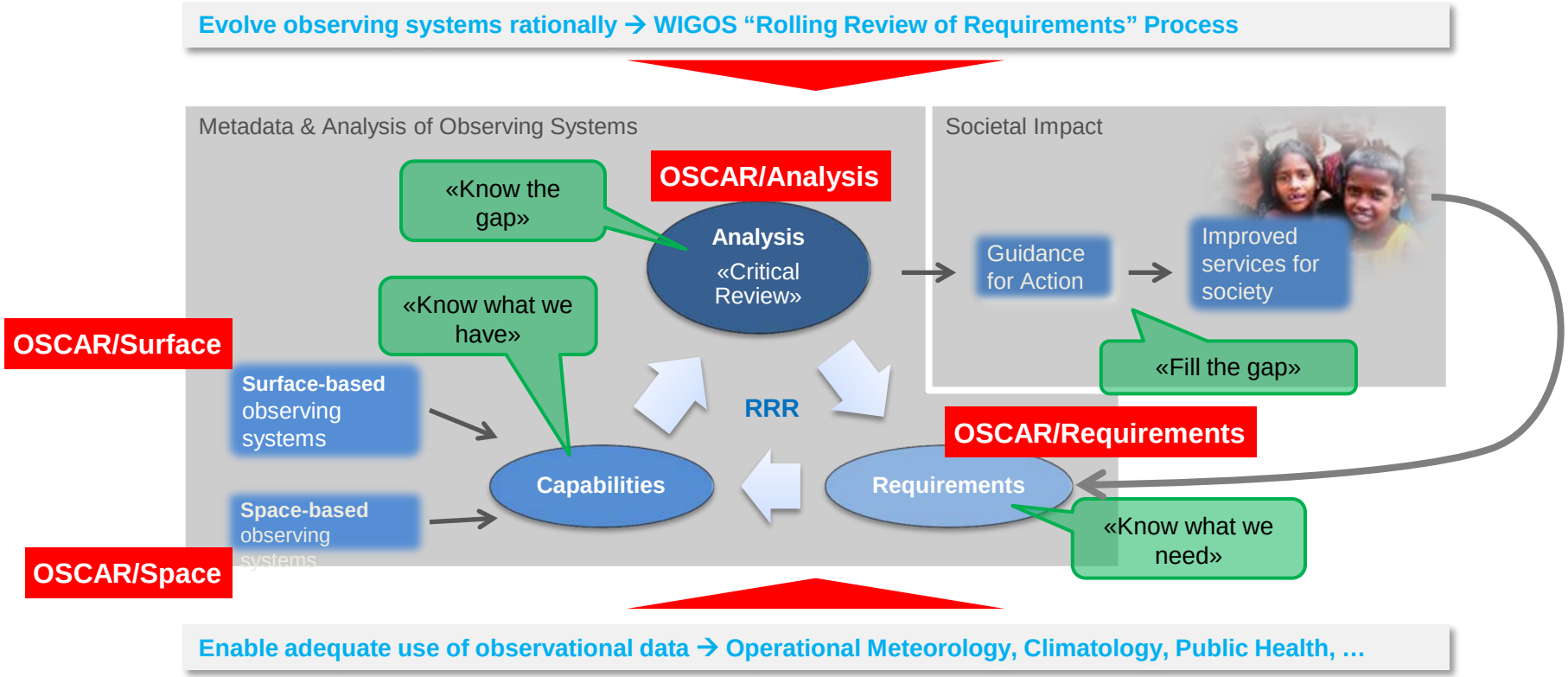




WIGOS Targeted observing systems

- WMO Observing Systems
  - Global Observing System (WWW/**GOS**)
  - Observing component of Global Atmospheric Watch (**GAW**)
  - WMO Hydrological Observing System (**WHOS**)
  - Observing component of Global Cryosphere Watch (**GCW**)
- Co-Sponsored Observing Systems
  - Global Climate Observing System (**GCOS**) (WMO-IOC-UNEP-ISC)
  - Global Ocean Observing System (**GOOS**) (IOC-WMO-UNEP-ISC)

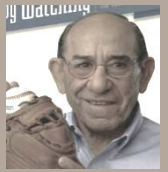
RRR and OSCAR



WIGOS metadata standard and exchange format(s)

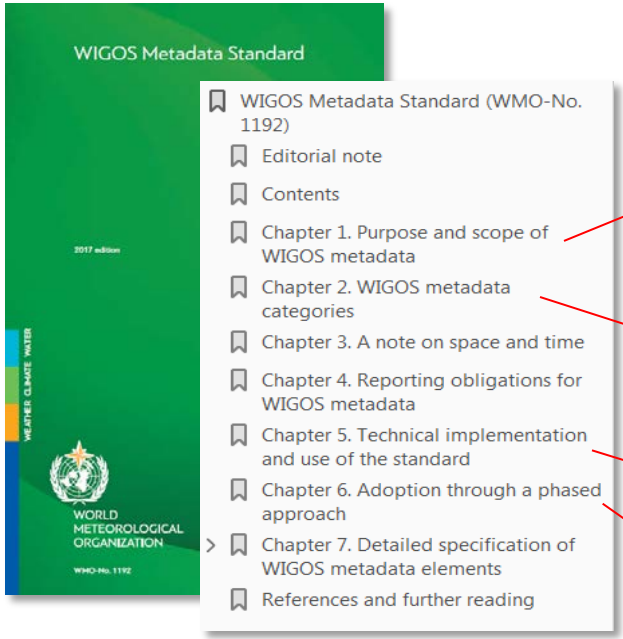
“If the world were perfect, it wouldn't be.”

— Yogi Berra



WIGOS Metadata Standard

Approved by WMO Cg-17 (2015)



WIGOS Metadata Standard (WMO-No. 1192)
Editorial note
Contents
Chapter 1. Purpose and scope of WIGOS metadata
Chapter 2. WIGOS metadata categories
Chapter 3. A note on space and time
Chapter 4. Reporting obligations for WIGOS metadata
Chapter 5. Technical implementation and use of the standard
Chapter 6. Adoption through a phased approach
Chapter 7. Detailed specification of WIGOS metadata elements
References and further reading

- Land, ocean, space
- Fixed, mobile observing facilities
- In-situ, remote-sensing instruments
- Physical, chemical, biological, hydrological observations
- Weather, climate, warnings, …

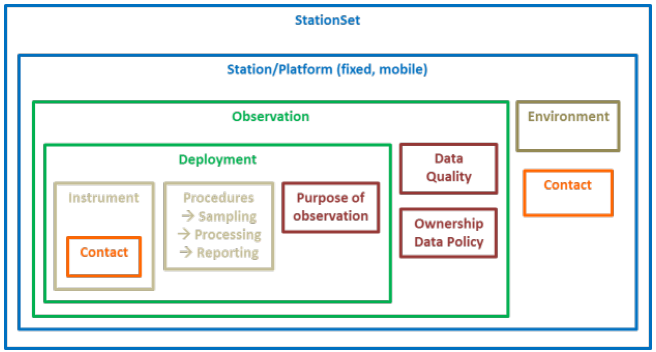
XML schema & API

2016 - 2019

1. Observed variable
2. Purpose of observation
3. Station/ platform
4. Environment
5. Instruments & methods of observation
6. Sampling
7. Data processing and reporting
8. Data Quality
9. Ownership and Data Policy
10. Contact

https://wis.wmo.int/WIGOS-MD

WIGOS metadata exchange format(s)



1. Observed variable
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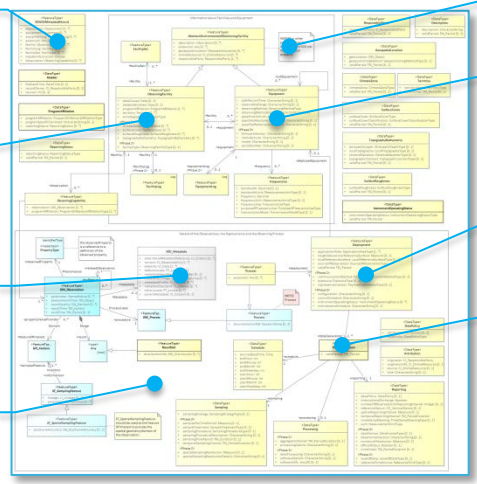
WMD Record

Observing facility

«WIS»-type metadata

Observation



Extensions

Equipment

Deployment

DataGeneration
- Schedule
- Sampling
- Processing
- Reporting

```
<?xml version="1.0" encoding="UTF-8"?>
- <wmdr:WIGOSMetadataRecord xsi:schemaLocation="http://def.wmo.int/wmdr/2017 file:///C:/svn/wmdr/branches/devel
xmlns:sams="http://www.opengis.net/samplingSpatial/2.0" xmlns:sam="http://www.opengis.net/sampling/2.0" xmlns:
xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:wmdr="http://d
  - <wmdr:headerInformation owns="false">
      <wmdr:Header/>
    </wmdr:headerInformation>
  - <wmdr:facility>
    - <wmdr:ObservingFacility gml:id="_0-20008-0-JFJ">
        <gml:description>The high alpine research station Jungfraujoch is situated on a mountain saddle between the
          surrounded by highly industrialized regions at much lower altitudes. This special geographical situation of
          layer to the free troposphere.</gml:description>
        <gml:identifier codeSpace="http://wigos.wmo.int">http://wigos.wmo.int/0/20008/0/JFJ</gml:identifier>
        <gml:name>Jungfraujoch</gml:name>
```

WMDR
XSD
XML

OSCAR/Surface

Reference implementation of WMDS

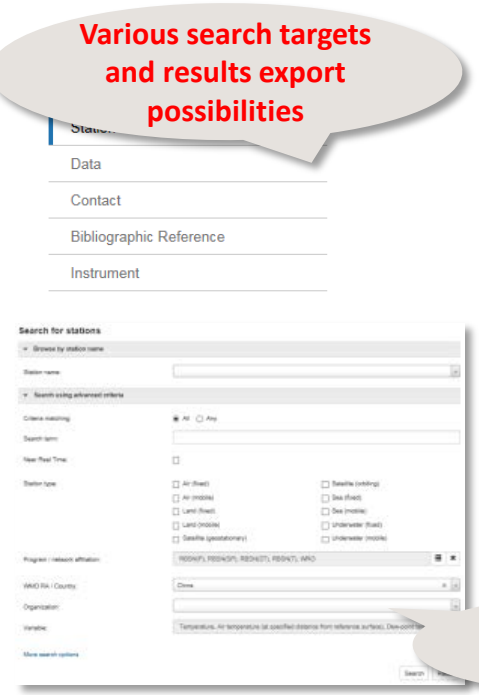
Public web interface

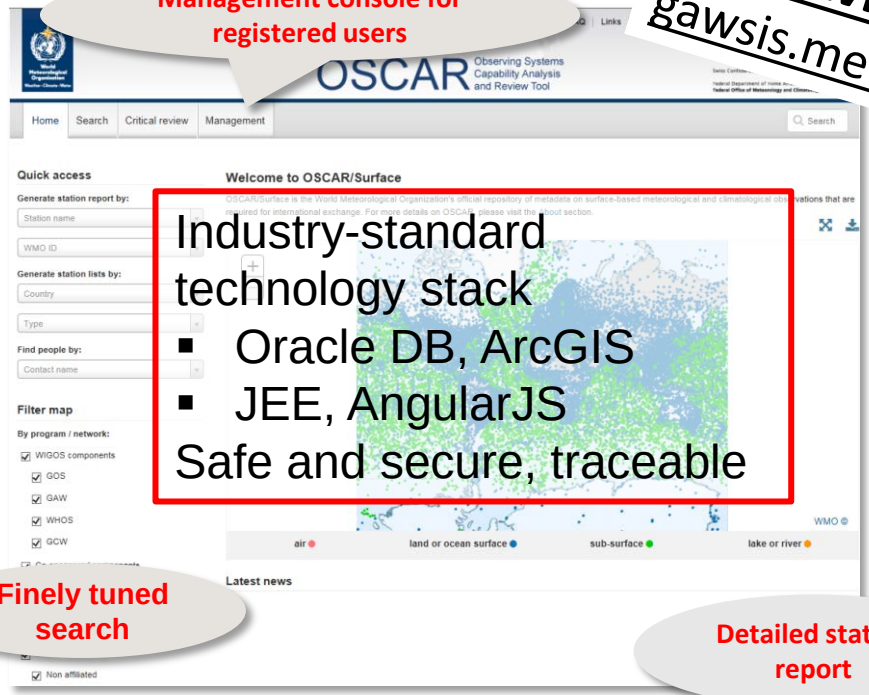
oscar.wmo.int/surface

gawsis.meteoswiss.ch

Various search targets and results export possibilities

Management console for registered users

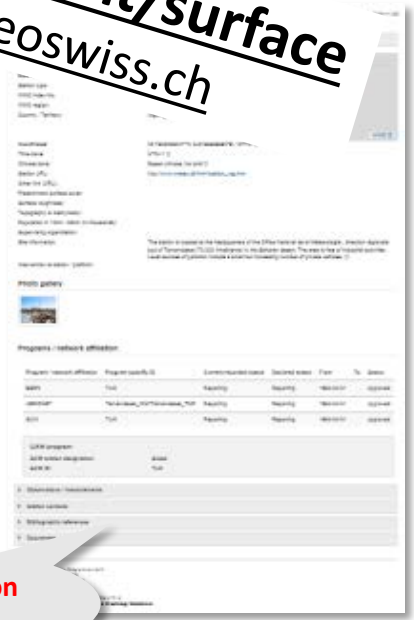




Industry-standard technology stack

- Oracle DB, ArcGIS
- JEE, AngularJS

Safe and secure, traceable

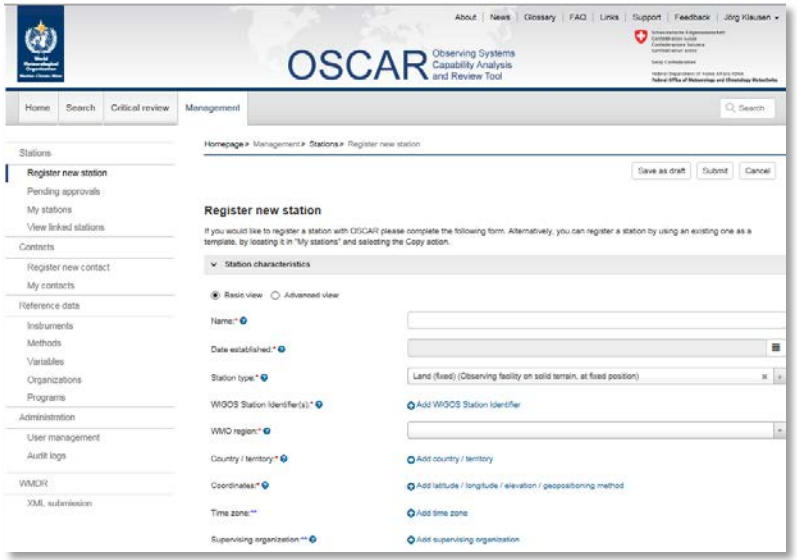


Finely tuned search

Detailed station report

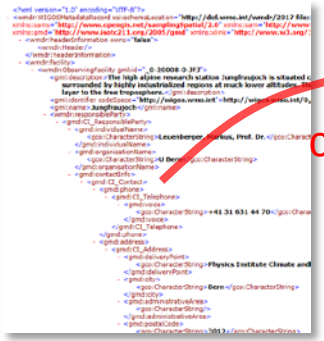
Restricted management console

- Stations
  - Basic characteristics
  - Photos
  - History
- Observations
  - Location
  - Variable
  - Methods
  - Instruments
  - Quality and uncertainty
  - History
- Contacts
- Bibliographic references & documents



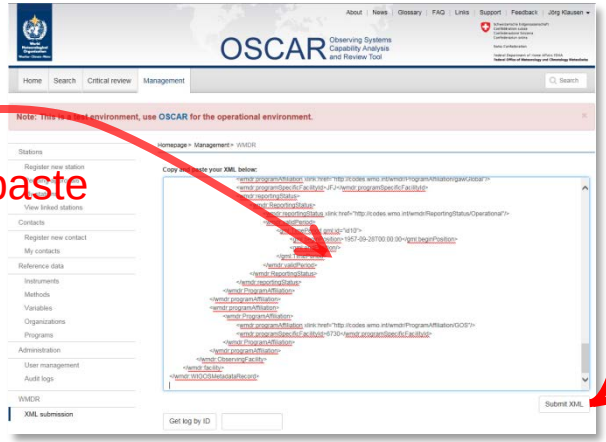
GUI interface to API endpoint for testing ...

- Upload full records or increments
- Register or update stations, observations, deployments, contacts, …
- Flexible + powerful = tricky!



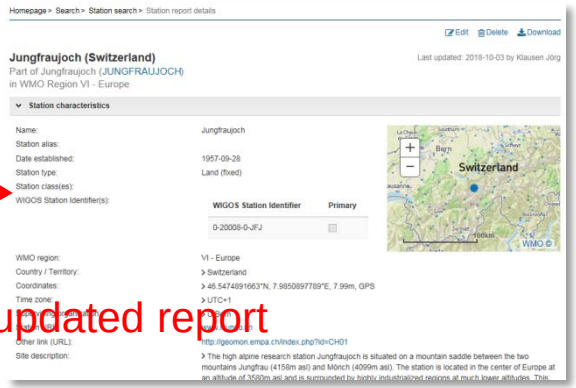
Generate XML

copy/paste



log

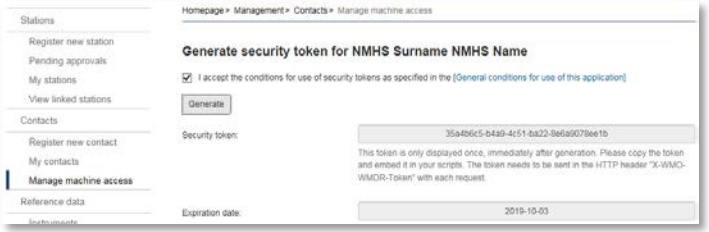
new/updated report



REST API for search and upload

- https://oscar.wmo.int/surface/rest/api?_wadl
- Public (GET) endpoints, e.g., station search
- Private (POST) endpoint requiring security token for upload of XML and different scope
  - NMHSs → their territory
  - World data centres → global
  - Instrument experts → instrument catalogue

```
- <resource path="/upload">
  - <method name="POST">
    - <request>
      - <representation mediaType="application/xml">
          <param type="xs:string" style="plain" name="request"/>
        </representation>
      </request>
    - <response>
        <representation mediaType="application/json"/>
      </response>
    </method>
  </resource>
```



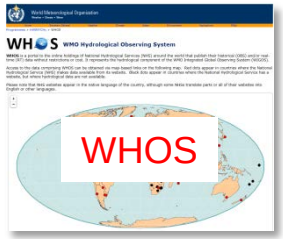

```
>>> url = 'https://oscar.wmo.int/surface/rest/wmd/upload/'
>>> headers = {'X-WMO-WMDR-Token': '35a4b6c5-b4a9-4c51-ba22-8e6a9078ee1b'}
>>> files = {'file': open('observations_0-2008-0-JFJ_atmosSurfaceOzone.xml', 'rb'), 'application/xml'}

>>> r = requests.post(url, headers=headers, files=files)
>>> r.text
{
  ...
  "files": {
    "file": "<?xml version="1.0" encoding="UTF-8"?><wmdr:WIGOSMetadataRecord xmlns:wmdr=..."
  },
  ...
}
```

Outlook

“Cut my pie into four pieces, I don’t think I could eat eight.”
— Yogi Berra

(Re-)link data centres to OSCAR/Surface



NDACC

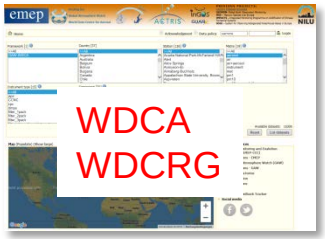
OSCAR Observing Systems Capability Analysis and Review Tool

GAWSIS STATION INFORMATION SYSTEM

API

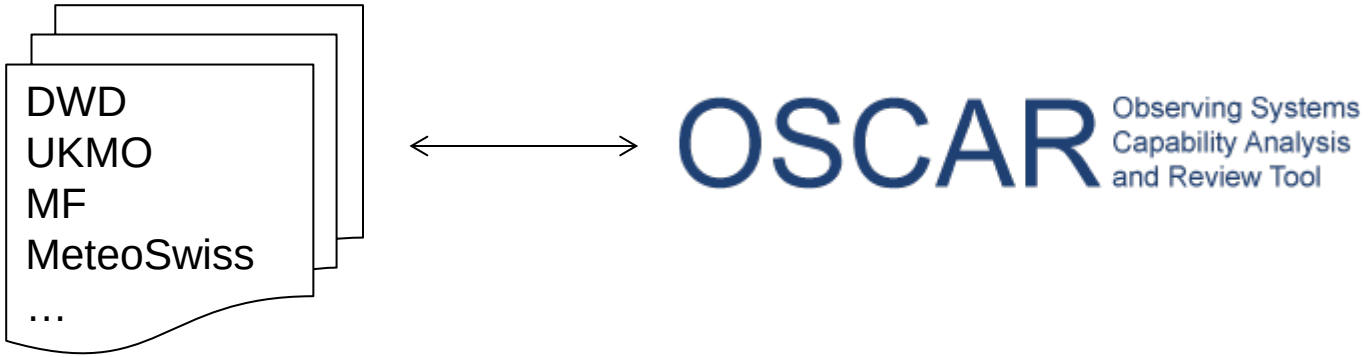
E-PROFILE
WINPROF
Amdar
…

Vol A

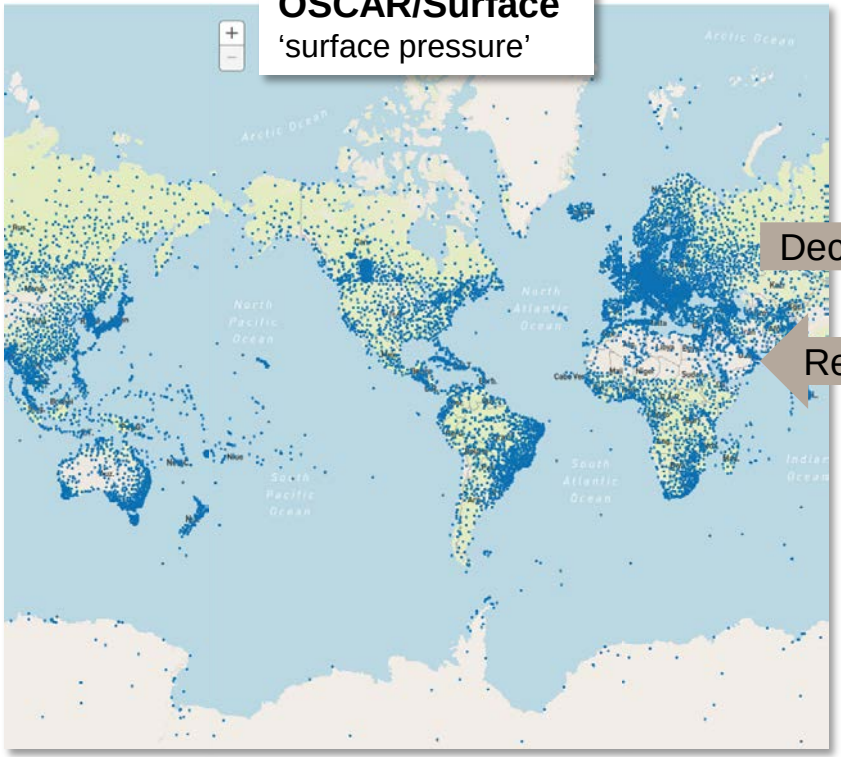


Link NMHSs to OSCAR/Surface

- Primary candidates are the larger services with own metadata repositories
  - Export WMDR records in XML
  - Upload to OSCAR/Surface using API

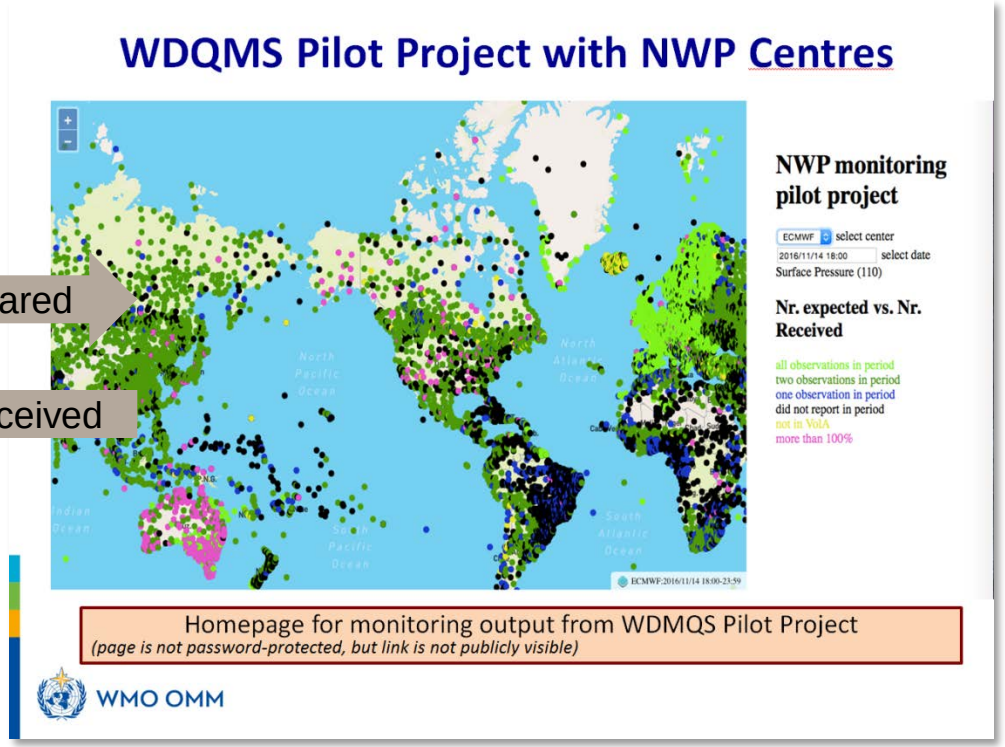


OSCAR/Surface &
WIGOS Data Quality Monitoring System (WDQMS)



Declared

Received



Improve OSCAR/Surface API

- Extend API to allow retrieval of
  - Full and partial station records as
    - WMDR records (XML, JSON)
    - WIS records (XML, JSON)
  - Lists based on parameterized searches
- …

Furthermore …

- Integration of OSCAR toolset
- Integrate ABOS
- Multilingual support
- Evolve web application’s functionalities, workflows …

Training

RA III Lima 2017

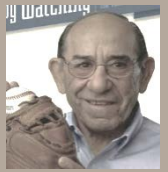
RA IV Habana 2018

Please let us know about your training needs!

Questions?

“If you ask me anything I don't know, I'm not going to answer.”

— Yogi Berra



Thank you for your attention

- For more information:
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- oscar@wmo.int

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