

Update on MPLNET WMDR XML Files action item, and relation to GALION and other contributing networks

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1. Update on open action item: AI2019-4: MPLNET WMDR XML files
 - Update MPLNET entries in OSCAR (not done in ~10 years??)
2. Use of OSCAR for GALION Metadata and Search & Discovery Tool
3. Coordination of GAW contributing networks and OSCAR/GAWSIS

Update on open action item: AI2019-4: MPLNET WMDR XML files

Now have ability to extract WIGOS XML files and search results (json) from OSCAR

- Will automate this in future (update daily)
- Results/files stored locally
- Library routines developed to read/manipulate/save
- Next step, testing uploads back to OSCAR API

Update on open action item: AI2019-4: MPLNET WMDR XML files

```
RESULTS: STRUCTURE<ANONYMOUS>
└─ SITE:          "GSFC"
└─ TITLE:         "GSFC"
└─ ALTITUDE:      0.0500000
└─ LATITUDE:      38.9930
└─ LONGITUDE:     -76.8400
└─ AZIMUTH:        0.00000
└─ ZENITH:        0.00000
└─ PUBLIC:        true
└─ ACTIVE:        true
└─ PRELIM:        ""
└─ FETCH:         true
└─ FETCH_ADDRESS: ""
└─ FETCH_SCRIPT:  "direct_push"
└─ FETCH_INTERVAL: 0.04166667
└─ FETCH_WARN_DELAY: 1.0000000
└─ AERONET_SITE:  "GSFC"
└─ AERONET_PRINCIPAL_INVESTIGATOR: "10"
└─ PARTNER_PRINCIPAL_INVESTIGATOR: "1"
└─ PARTNER_SCIENCE_CONTACT:      "1"
└─ PARTNER_TECHNICAL_CONTACT:    "41"
└─ PARTNER_INSTITUTION:         ""
└─ SITE_ADDRESS:   ""
└─ SHIPPING_ADDRESS: ""
└─ SHIPPING_INFO:   ""
└─ DATE:          2020-01-01
└─ INSTRUMENT:    "MPL44258"
└─ DATA_VALUES:   INT(4) = [0, 1, 2, 3]
└─ DATA_MEANINGS: STRING(4) = ["no_data", "data", "prelim", "missing_cals"]
└─ L0_ATM:        1
└─ L1_NRB:        1
└─ L1_ABS:        1
└─ L1_CLD:        1
└─ L1_CAER:       1
└─ L1_AER:        2
└─ L1_PBL:        2
└─ L15_NRB:       1
└─ L15_ABS:       1
└─ L15_CLD:       1
└─ L15_CAER:      1
└─ L15_AER:       2
└─ L15_PBL:       2
└─ LASER:         4
└─ WAVELENGTH:   5.32000e-07
└─ DETECTOR:     "Excelitas_SPCM-AQRH-14-FC_33621-1"
└─ DT_FILE:      "MPLNET_V3_CAL_DT_20171030_Excelitas_SPCM-AQRH-14-FC_33621-1.csv"
└─ DC_FILE:      "MPLNET_V3_CAL_DC_202001211932_MPL44258.nc4"
└─ AP_FILE:      "MPLNET_V3_CAL_AP_202001211913_MPL44258.nc4"
└─ OL_FILE:      "MPLNET_V3_CAL_OI_20191226_MPL44258.nc4"
└─ POL_FILE:     "MPLNET_V3_CAL_POL_20190617_MPL44258_GSFC.nc4"
```

MPLNET internal metadata base (entry example for one day at GSFC)

Will be able to update XML files directly from MPLNET database & upload to OSCAR
Or populate a template and upload that to OSCAR

Have added WIGOS parameters to MPLNET internal metadata base

```
└─ WIGOS_SITE:          "Goddard (MD)"
└─ WIGOS_SITE_ID:        "0-20008-0-GSF"
└─ WIGOS_SITE_WMO_ID:    "161"
└─ WIGOS_SITE_TYPE:      "landFixed"
└─ WIGOS_SITE_REGION:    ""
└─ WIGOS_SITE_TERRITORY: ""
└─ WIGOS_SITE_LAT_LON_DIFF_KM: FLOAT(2) = [0.971985, NaN]
└─ WIGOS_PROGRAM_AFFILIATION: 1
└─ WIGOS_PROGRAM_STATUS:   ""
└─ WIGOS_OBSERVATION_VARIABLE: "326,321,315,506,180,531,532,508"
└─ WIGOS_OBSERVATION_GEOMETRY: "verticalProfile,verticalProfile,verticalProfile,verticalProfile,verticalProfile,verticalProfile,verticalProfile,verticalProfile"
└─ WIGOS_OBSERVATION_APPLICATION_AREA: "missing_in_oscar;missing_in_oscar;climateMonitoring;aeronauticalMeteorology;climateMonitoring;climateMonitoring"
└─ WIGOS_OBSERVATION_INSTRUMENT: "243,243,243,243,243,243,243"
└─ WIGOS_OBSERVATION_DATA_LEVEL: "level1,level2,level2,level2,level2,level2,level2,level2"
└─ WIGOS_OBSERVATION_LAYER: "PBL;FT;UTLS,PBL;FT;UTLS,PBL;FT;UTLS,PBL;FT;UTLS,PBL;FT;UTLS,PBL;FT;UTLS,PBL;FT;UTLS,PBL;FT;UTLS"
```

Update on open action item: AI2019-4: MPLNET WMDR XML files

Total MPLNET Sites (2000 – current): 73

- Matching Sites in OSCAR: 29
 - Affiliated Sites: 9
 - NOTE: Sede Boker in WIGOS is not same location as MPLNET! (>1 km difference)
 - Sites left to affiliate: 20
- Sites that do NOT exist in OSCAR: 44
 - Must register and affiliate

Issues remain with lidar related OSCAR vocabulary, a GALION wide problem (reported at last meeting):

- Some important variables missing (e.g. backscatter)
- Variables in requirements but not in code list (e.g. PBL height)
- Layer/Altitude in code list is not helpful for atmospheric observations
 - Suggest using layers from OSCAR tables
- Wavelength for remote sensing is missing in codes and XML file structure (not just lidar problem)

MPLNET is part of EarthCARE cal/val team: will involve some interaction with NILU starting next year

GALION Search & Discovery Tool:

Utilizing OSCAR (copied XML & json search results for each network, daily update)

The screenshot shows a web browser window for the GALION North America site, accessible via the URL mplnet.gsfc.nasa.gov. The page features a dark header with the GALION logo and the text "The WMO GAW Aerosol Lidar Observation Network". Below the header is a banner with the text "GALION North America" and a background image of a lidar profile. The main content area is titled "Site Search & Discovery Page". On the left, there is a sidebar with a navigation menu:

- GALION Home
- Find Sites
- North American Networks
 - MPLNET
 - TOLNET
 - EPA PAMS
 - WISC HSRL
 - DOE ARM
 - Contacts
- Other Networks
 - EARLINET
 - AD-NET
 - LALINET
 - NDACC

On the right side of the main content area, there are several search filters:

- Select GALION Network(s):
 - GALION
 - ADNet
 - EARLINET
 - LALINET
 - MPLNET
 - NDACC
- Select Other Network(s):
 - AERONET
 - BSRN
 - CASTNET
 - Ceilometers
 - SHADOZ
 - TCCON
- Search Filters:
 - WMO Region:
 - Network Status:
- Type of Search:
 - or
 - and

GALION Search & Discovery Tool:

Utilizing OSCAR
(copied XML for each
network, daily
update)

Search a network

The WMO GAW Aerosol Lidar Observation Network

GALION North America

Site Search & Discovery Page

Select GALION Network(s):
GALION
ADNet
EARLINET
LALINET
MPLNET
NDACC

Select Other Network(s):
AERONET
BSRN
CASTNET
Ceilometers
SHADOZ
TCCON

Search Filters:
WMO Region:
No Filter

Network Status:
No Filter

Type of Search:
or

Search

Search results: 9 sites found

Map | Satellite

Google Map data ©2020 Imagery ©2020 NASA Terms of Use

Map Legend: ● MPLNET

#	WMO Site	Site Information	Networks		
			Name	Site	Status
1	Abracos Hill WMO ID: 995 WIGOS ID: 0-20008-0-ABH	Lat: -10.7667 Lon: -62.3667 Elevation: 283 m	MPLNET	Abracos Hill	Planned
2	Goddard (MD) WMO ID: 161 WIGOS ID: 0-20008-0-GSF	Lat: 38.9900 Lon: -76.8300 Elevation: 100 m	AERONET GAW Regional MPLNET	GSFC GSF GSFC	Operational Operational Operational

GALION Search & Discovery Tool:

Utilizing OSCAR
(copied XML for each
network, daily
update)

Search multiple
GALION networks

The WMO GAW Aerosol Lidar Observation Network

GALION North America

Site Search & Discovery Page

Select GALION Network(s):
GALION
ADNet
EARLINET
LALINET
MPLNET
NDACC

Select Other Network(s):
AERONET
BSRN
CASTNET
Ceilometers
SHADOZ
TCCON

Search Filters:
WMO Region:
No Filter

Network Status:
No Filter

Type of Search:
or

Search

Search results: 52 sites found

Map | Satellite

Google Map data ©2020 Imagery ©2020 NASA Terms of Use

Map Legend: ● ADNet ● EARLINET ● LALINET ● MPLNET

#	WMO Site	Site Information	Networks		
			Name	Site	Status
1	Abracos Hill WMO ID: 995 WIGOS ID: 0-20008-0-ABH	Lat: -10.7667 Lon: -62.3667 Elevation: 283 m	MPLNET	Abracos Hill	Planned
2	Andoya WMO ID: 371 WIGOS ID: 0-20008-0-ARR	Lat: 69.2785 Lon: 16.0093 Elevation: 360 m	AERONET EARLINET EMEP NDACC	Andenes Andenes NO0090R ANDOYA	Operational Operational Operational Operational

GALION Search & Discovery Tool:

Utilizing OSCAR
(copied XML for each
network, daily
update)

Not limited to
GALION, search
different networks.

Gray markers
indicate super sites
with multiple
network co-locations

The WMO GAW Aerosol Lidar Observation Network

GALION North America

Site Search & Discovery Page

Select GALION Network(s):
GALION
ADNet
EARLINET
LALINET
MPLNET
NDACC

Select Other Network(s):
AERONET
BSRN
CASTNET
Ceilometers
SHADOZ
TCCON

Search Filters:
WMO Region:
No Filter

Network Status:
No Filter

Type of Search:
or

Search

Search results: 154 sites found

Map | Satellite

Google Map data ©2020 Imagery ©2020 NASA Terms of Use

Map Legend: ADNet AERONET EARLINET LALINET MPLNET SHADOZ Multiple

#	WMO Site	Site Information	Networks		
			Name	Site	Status
1	Abracos Hill WMO ID: 995 WIGOS ID: 0-20008-0-ABH	Lat: -10.7667 Lon: -62.3667 Elevation: 283 m	MPLNET	Abracos Hill	Planned
2	Ahmedabad WMO ID: 23 WIGOS ID: 0-20008-0-AHM	Lat: 23.0167 Lon: 72.6500 Elevation: 55 m	AERONET GAW Regional	Ahmedabad AHM	Operational Operational

GALION Search & Discovery Tool:

Utilizing OSCAR
(copied XML for each
network, daily
update)

Search networks and
filter by WIGOS
parameters: shown
here is Region
example

The WMO GAW Aerosol Lidar Observation Network

GALION North America

Site Search & Discovery Page

Select GALION Network(s): GALION
Select Other Network(s): AERONET
WMO Region: North America, Central America and the Caribbean
Network Status: No Filter

Type of Search: or

Search results: 38 sites found . Filters Applied:
WMO Region: North America, Central America and the Caribbean

Map | Satellite

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Map Legend: ADNet EARLINET LALINET MPLNET AERONET SHADOZ Multiple

#	WMO Site	Site Information	Networks		
			Name	Site	Status
1	Alajuela WMO ID: 450 WIGOS ID: 0-20008-0-ALC	Lat: 9.98000 Lon: -84.2100 Elevation: 899 m	SHADOZ	Alajuela	Partly operational
2	Beltsville (MD) WMO ID: 105 WIGOS ID: 0-20008-0-BEL	Lat: 39.02000 Lon: -76.95000 Elevation: 34 m	AERONET CASTNET GAW Regional	USDA BEL116 BEL	Operational Operational Operational

GALION Search & Discovery Tool:

Utilizing OSCAR
(copied XML for each
network, daily
update)

Previous examples
were OR searches

Here can do AND
searches, and display
only super sites with
multiple network colo-
locations

The WMO GAW Aerosol Lidar Observation Network

GALION North America

Site Search & Discovery Page

Select GALION Network(s): GALION ADNet EARLINET LALINET MPLNET NDACC

Select Other Network(s): AERONET BSRN CASTNET Ceilometers SHADOZ TCCON

Search Filters: WMO Region: No Filter Network Status: No Filter

Type of Search: and

Search results: 9 sites found

Map Legend: ● EARLINET, AERONET

#	WMO Site	Site Information	Networks		
			Name	Site	Status
1	Andoya WMO ID: 371 WIGOS ID: 0-20008-0-ARR	Lat: 69.2785 Lon: 16.0093 Elevation: 360 m	AERONET EARLINET EMEP NDACC	Andenes Andenes NO0090R ANDOYA	Operational Operational Operational Operational
2	Belsk WMO ID: 104 WIGOS ID: 0-20008-0-COG	Lat: 51.8400 Lon: 20.7900 Elevation: 180 m	AERONET EARLINET GAW Regional	Belsk Belsk COG	Operational Operational Operational

Coordination of GAW contributing networks and OSCAR/GAWSIS

One major road-block relates to OSCAR accounts and permissions (for tokens to fully utilize the API)

- As ETDC member, GALION co-chair, and MPLNET data center lead I still do NOT have a token!

I offered to take over as program focal point for GAW contributing networks (currently Markus, who is ex-officio)

- I could grant my own token, and manage this for other contributing network POCs
- I am a contributing network PI, so I am willing to help in this area

Summary of working with the WIGOS XML files, and the proposed template approach

- I think a template approach makes sense for contributing networks to upload via API and maintain their metadata
- Problems extracting OSCAR information from API and using it
 - The problem for me is not XML, it's the varying content/structure of the files (which may be XML, json, csv)
 - Elements may be missing from data structure in files, is there a "required" list of elements for each file?
 - If elements are missing, it makes programming reader apps much more complicated and time consuming
 - I suggest having a fixed API file content, and fill missing entries with agreed NULL values