Data of the Perdigão campaign

Data produced in Perdigão is being collected by the DTU, UCAR and UPORTO.

1. Introduction

The current status was assembled in 26/04/2019 from the information available at Perdigão Data Management Web pages at EOL and at the DTU+UPORTO archives.

Products, reports, mission, etc. are not included yet in this document.

The UPORTO Data Archive (UDA) may be accessed using the THREDDS Data Server (TDS) by providing the same credentials as in the UCAR ftp site (perdigao / B*****!)[1].

WindsP App users may explore the UPORTO Data Archive (UDA) but, when they request access to data or metadata that is in the Data Archive, they have to provide the TDS credentials. Campaign participants do not need to provide the TDS password though.

Useful links:

- The TDS catalogue: https://windsptds.fe.up.pt/thredds/catalog_perdigao.html
- The UDA view of the catalogue: https://perdigao.fe.up.pt/datasets/thredds/catalog_perdigao
- The TDS archive: https://windsptds.fe.up.pt/thredds/archive_perdigao.html

[2020.05.23] datasets missing:

- *Ancillary > Cornell APS Data (**Cornell**)*
- *Ancillary > ENERCON Wind Turbine SCADA Data (**ENERCON**)*
- *Land Based > IPMA Portugal Surface Meteorological Data (**IPMA**)*
- *Radar > IPMA Radar Data (**IPMA**)*
- *Satellite > Meteosat Satellite Data (**IPMA**)*

[2020.05.23] TDS password removed

- *In the TDS configuration catalogs, removed restrictAccess={security role} attributes to the dataset or datasetScan elements*

[1] The TDS server archive organised by data producer: https://windsptds.fe.up.pt/thredds/archive_perdigao.html

2. Data Categories

For each **Data category** (level 1 of UDA) a table with a line for each **Dataset name** (level 2 of UDA) displays the status of the 3 archives for Perdigão (DTU, UP, UCAR).

The categories, with the two levels, can be browsed in the UPORTO Data Archive using the Winds Web App.

Table explanation:

✔ — available at the (MASTER) archive (uploaded/maintained by producer)
✔ — available at the (SLAVE) archive (mirrored from MASTER)
✘ — NOT available at the archive yet

Ancillary

Dataset name	Institution	Responsible	DTU	UP	UCAR
Cornell APS Data	Cornell		✘	✘	✘
Cornell High Frequency Seismometer Data	Cornell		✔	✔	✔
DLR Acoustic Measurement Data	DLR	A. Schady	✔	✔	✔
ENERCON Acoustic Data	ENERCON		✔	✔	✔
ENERCON Wind Turbine SCADA Data	ENERCON		✘	✘	✘

Flux

Dataset name	Institution	Responsible	DTU	UP	UCAR
ARL Scintillometer Data	ALR	R. Krishnamurthy	✔	✔	✔
DTU Tower Data	DTU	J. Mann	✔	✔	✔
NCAR/EOL Preliminary 5 minute ISFS data, instrument coordinates, not tilt corrected	NCAR/EOL		✔	✔	✔
NCAR/EOL Quality Controlled 5-minute ISFS surface flux data, geographic coordinate, tilt corrected	NCAR/EOL		✔	✔	✔
NCAR/EOL Quality Controlled High-rate ISFS surface flux data, geographic coordinate, tilt corrected	NCAR/EOL		✔	✔	✔

Land Based

Dataset name	Institution	Responsible	DTU	UP	UCAR
DLR HATPRO Surface Meteorological Data	DLR	M. Hagen	✔	✔	✔
GTS LDM Surface Hourly Observations (Global, GEMPAK)	NCAR/EOL		✔	✔	✔
GTS LDM Surface Synoptic Observations (Global, GEMPAK)	NCAR/EOL		✔	✔	✔
IPMA Portugal Surface Meteorological Data	IPMA		✘	✘	✘
LDM Surface METAR Data (METAR format)	NCAR/EOL		✔	✔	✔
NCAR-EOL ISS Surface Meteorology Data (Sodar-RASS Site)	NCAR/EOL		✔	✔	✔
NCAR-EOL ISS Surface Meteorology Data (Sounding Site at the upper orange grove)	NCAR/EOL		✔	✔	✔
NCAR-EOL ISS Surface Meteorology Data (West Profiler Site)	NCAR/EOL		✔	✔	✔
NOAA-ESRL-GSD MADIS GTS METAR Data (netCDF format)	NOAA/ESRL		✔	✔	✔

Land Characterization

Dataset name	Institution	Responsible	DTU	UP	UCAR
Lidar Aerial Survey Data	UPORTO	J. Carlos Matos	✔	✔	✔

Lightning

Dataset name	Institution	Responsible	DTU	UP	UCAR
Portugal Lightning Detection Network (LDN) Data	IPMA	S. Correia & V. Prior	✔	✔	✔

Model

Dataset name	Institution	Responsible	DTU	UP	UCAR
ERA5 Reanalysis Data	DTU	J. Mann	✔	✔	✔

Photography

Dataset name	Institution	Responsible	DTU	UP	UCAR
NCAR-EOL ISS Webcam Imagery (Sounding Site at the upper orange grove)	NCAR/EOL		✔	✔	✔
NCAR-EOL ISS Webcam Imagery (West Profiler Site)	NCAR/EOL		✔	✔	✔

Radar

Dataset name	Institution	Responsible	DTU	UP	UCAR
IPMA Radar Data	IPMA		✘	✘	✘

Satellite

Dataset name	Institution	Responsible	DTU	UP	UCAR
Meteosat Satellite Data	IPMA		✘	✘	✘

Upper Air: Lidar

Dataset name	Institution	Responsible	DTU	UP	UCAR
ARL Scanning Doppler Lidar at the George Site	ALR	R. Krishnamurthy	✔	✔	✔
ARL Scanning Doppler Lidar at the Lionstail Site	ALR	R. Krishnamurthy	✔	✔	✔
Cornell Galion Scanning Lidar Data	Cornell	R. Barthelmie	✔	✔	✔
Cornell ZephIR Profiling Lidar Data	Cornell	R. Barthelmie, S. Pryor	✔	✔	✔
CU Profiling Lidar Data	CU	J. Lundquist	✔	✔	✔
DLR Scanning Lidar Data	DLR	N. Wildmann	✔	✔	✔
DTU Scanning Lidar Data	DTU	J. Mann	✔	✔	✔
ENERCON Profiling Lidar Data	ENERCON	J. Carlos Matos	✔	✔	✔
Leosphere Windcube Profiling Lidar Data	ZWS	J. Carlos Matos	✔	✔	✔
Lidar Aerial Survey Data	UPORTO	J. Carlos Matos	✔	✔	✔
Aerial Survey Lidar and Photography Data	DTU	J. Mann	✔	✔	✔
NCAR-EOL Water Vapor DIAL Data	NCAR/EOL		✔	✔	✔
NSSL-OU CLAMPS Scanning Doppler Lidar Data	OU	P. Klein	✔	✔	✔
UND Ceilometer Data	UND	L. Leo	✔	✔	✔
UND Scanning Doppler Lidar at the Lionshead Site	UND	R. Krishnamurthy	✔	✔	✔
UND Scanning Doppler Lidar at the MI6 Site	UND	R. Krishnamurthy	✔	✔	✔
UND Scanning Doppler Lidar at the Orange Site	UND	R. Krishnamurthy	✔	✔	✔
WindForS Scanning Lidar Data	ZWS		✔	✔	✔

Upper Air: Profiler

Dataset name	Institution	Responsible	DTU	UP	UCAR
NCAR-EOL ISS 1290MHz Wind Profiler Winds and RASS (West Profiler Site)	NCAR/EOL		✔	✔	✔
NCAS Manchester Radar Wind Profiler 1290 MHz Alvaiade Data	NCAS	E. Norton	✔	✔	✔

Upper Air: Radiometer

Dataset name	Institution	Responsible	DTU	UP	UCAR
DLR HATPRO Microwave Radiometer Level 1 Brightness Temperature Data	DLR	M. Hagen	✔	✔	✔
DLR HATPRO Microwave Radiometer Level 2 Temperature and Humidity Profile Data	DLR	M. Hagen	✔	✔	✔
NSSL-OU CLAMPS AERIoe Data	UO	P. Klein	✔	✔	✔
NSSL-OU CLAMPS MWRoe Data	UO	P. Klein	✔	✔	✔
Temperature and water vapor mixing ratio profiles retrieved from the DLR MWR	NOAA and DLR	Turner, D. and M. Hagen	✔	✔	✔
Temperature and water vapor mixing ratio profiles retrieved from the Notre Dame MWR	NOAA	Turner, D.	✔	✔	✔
Temperature and water vapor mixing ratio profiles retrieved from the OU/NSSL CLAMPS MWR [(NOAA and OU)]	NOAA and OU	Turner, D. and P. Klein	✔	✔	✔
UND Microwave Radiometer Data	UND	L. Leo	✔	✔	✔

Upper Air: Radiosonde

Dataset name	Institution	Responsible	DTU	UP	UCAR
GTS LDM Sounding Observations (Global, GEMPAK)	NCAR/EOL		✔	✔	✔
NCAR/EOL Quality Controlled Radiosonde Data (Upper Orange Grove)	NCAR/EOL		✔	✔	✔
Portugal Mandatory/Significant Level Radiosonde Data	NCAR/EOL		✔	✔	✔
Spain High Resolution Radiosonde Data	NCAR/EOL		✔	✔	✔
UND Radiosonde Data	UND		✔	✔	✔

Upper Air: SODAR

Dataset name	Institution	Responsible	DTU	UP	UCAR
NCAR-EOL ISS Sodar-RASS Data (Sodar-RASS Site)	NCAR/EOL		✔	✔	✔
UND SODAR and RASS Data	UND	L. Leo	✔	✔	✔

Upper Air: Tethersonde

Dataset name	Institution	Responsible	DTU	UP	UCAR
ARL Tethered Lifting System (TLS) Data	ARL	E. Creegen	✔	✔	✔
CU Tethered Lifting System (TLS) Data	CU	J. Lundquist	✔	✔	✔

3. UDA Archive

How to upload data to UDA (UPORTO Data Archive) or get data out of UDA for mirroring.

3.1 Using rsync

UPORTO data archive for Perdigão available exports:

```
nejoco@VIND-pNEWA04:~> rsync -rdt rsync://windsptds.fe.up.pt
test            RSYNC test
archive         RSYNC UDA FILES (read only)
ucar            RSYNC UCAR FILES
dtu             RSYNC DTU FILES
inegi           RSYNC INEGI FILES
dlr             RSYNC DLR FILES
windfors        RSYNC WindForS FILES
```

3.2 Uploading data to UDA

Upload DTU data

UPORTO (as nejoco@login.neweuropeanwindatlas.eu) uses the UDA export `dtu@windsptds.fe.up.pt::dtu` to sync data collected by DTU.

[2020.05.23] cron jobs removed and the mirroring process stopped

First a complete mirror was in place, by automatically syncing every 4 hours the DTU data directory using a cron job: `/usr/bin/rsync -az -delete /newa/WP2/PERDIGAO/ dtu@windsptds.fe.up.pt::dtu.`

Later the `-delete` option was removed and some directories excluded to achieve the Perdigão Data Archive at UDA.

```
$ crontab -l
```

```
# DTU data sync to UDA, At minute 31 past every 4th hour
31 */4 * * * /usr/bin/rsync -az --exclude-from 'sync-exclude-list'
/newa/WP2/PERDIGAO/ dtu@windsptds.fe.up.pt::dtu > /dev/null 2>&1
```

```
$ cat ~nejoco/sync-exclude-list
archive/
data/DLR_WindScanner/
```

Upload UCAR data

UCAR uses the UDA export `ucar@windsptds.fe.up.pt::ucar` to copy NCAR/EOL ISFS data.

Upload DLR data

DLR uses the UDA export `dlr@windsptds.fe.up.pt::dlr` to maintain the DLR data.

Upload INEGI data

INEGI uses the UDA export `inegi@windsptds.fe.up.pt::inegi` to maintain the ENERCON data and “Lidar Aerial Survey Data”.

Upload WindsForS data

WindsForS uses the UDA export `windfors@windsptds.fe.up.pt::windfors` to maintain the WindForS data.

Upload ARL data (from UCAR)

ARL data is mirrored from UCAR ftp site using wget when new data is available.

```
#! /bin/sh
dir=arl
source=ftp://ftp.eol.ucar.edu/pub/data/incoming/perdigao/uda/$dir
destination=/data/perdigao/ucar
wget -m -nH --cut-dirs=5 -P $destination $source
```

Upload EOL data (from UCAR)

EOL data is mirrored from the UCAR ftp site using wget when new data is available.

Upload NCAS data (from UCAR)

NCAS data is mirrored from the UCAR ftp site using wget when new data is available.

Upload ND data (from UCAR)

Notre Dame data is mirrored from the UCAR ftp site using wget when new data is available.

Upload OU data (from UCAR)

Oklahoma U. data is mirrored from the UCAR ftp site using wget when new data is available.

Upload IPMA data (from UCAR)

IPMA data is mirrored from the UCAR ftp site using wget when new data is available.

Upload Cornell data (from UCAR)

Cornell data is mirrored from the UCAR ftp site using wget when new data is available.

3.2 Mirror UDA to DTU

[2020.05.23] cron job removed and the mirroring process stopped

The UPORTO Data Archive (UDA) is automatically synced to the DTU, every 24 hours, from the UDA read only export: `uda@windsptds.fe.up.pt::archive/`, using a cron job[2]:

```
$ crontab -l

# UDA archive to DTU, At midnight every day
0 0 * * * /home/nejoco/sync-uda.sh >| sync-uda_last.log 2>&1

$ cat sync-uda.sh

#! /bin/sh
# the Perdigao root at NEWA storage
perdigao=/newa/WP2/PERDIGAO
# the archive root
archive=$perdigao/archive
# the actual size of the archive
echo "Total du of $archive:"
du -ks $archive
# the UDA readonly password
export RSYNC_PASSWORD=-password-
# catalogues to sync
CATALOGS="dlr enercon inegi ucar windfors"
for c in $CATALOGS; do
    # mirror catalog from the version at UDA (UPORTO)
    echo; echo "$(tr [a-z] [A-Z] <<< "$c"):"
    #cmd="rsync -avz uda@windsptds.fe.up.pt::archive/$c/ $archive/$c/"
    cmd="rsync -avz --delete uda@windsptds.fe.up.pt::archive/$c/
$archive/$c/"
    echo "$cmd..."
    # do it
    $cmd
done
# catalog structure
echo
tree -L 2 $archive
# total space usage for each archive
echo
du -khs $archive/*
# the final size of the archive
echo
echo "Total du of $archive:"
du -ks $archive
# end
```

[2] Setup in jlopes' account: `ssh nejoco@login.neweuropeanwindatlas.eu` (ended at 2020.05.31)

The DTU NEWA directory `/newa/WP2/PERDIGAO/archive/` contains an exact copy of UDA, except for the DTU data that are links to existing NEWA directories (in order to avoid using a duplication 1.8 TiB of storage).

```
/newa/WP2/PERDIGAO/archive
├── dlr
│   ├── HATPRO_level-1
│   ├── HATPRO_level-2
│   ├── HATPRO_surface-met
│   ├── mcs_data
│   ├── netcdf_lidar
│   └── raw_data
├── enercon
│   ├── LiDAR
│   └── NMT
├── dtu
│   ├── DTU_Leica_Scanning ->
│   ├── DTU_Mast_Data ->
│   └── DTU_WindScanner ->
├── inegi
│   ├── EnerconWindTurbine
│   ├── LeosphereWindcube
│   └── LidarAerialSurvey_RawData
├── ucar
│   ├── arl
│   ├── colorado
│   ├── cornell
│   ├── eol
│   ├── ipma
│   ├── isfs
│   ├── ncas
│   ├── notredame
│   ├── oklahoma
│   ├── supporting
└── windfors
    ├── 2017
    └── cross
```

3.3 Mirror UDA to NCAR

The UPORTO Data Archive (UDA) is manually synced to the UCAR, from the UDA read only export: `uda@windsptds.fe.up.pt::archive/`.

```
#! /bin/sh
# the local archive root (FIXME)
archive="perdigao/uda"
# the UDA readonly password
export RSYNC_PASSWORD=FIXME
# catalogues to sync (ucar excluded)
CATALOGS="dlr dtu enercon inegi windfors"
```

```
for c in $CATALOGS; do
    # mirror catalog from the version at UDA (UPORTO)
    echo; echo "$(tr [a-z] [A-Z] <<< "$c"):"
    cmd="rsync -avz uda@windsptds.fe.up.pt::archive/$c/ $archive/$c/"
    echo "$cmd..."; read proceed
    # uncomment next line to do it
    # $cmd
done
```

3.4 UDA's archive

The content of the archive as of 2019.01.18:

```
├── dlr
│   ├── HATPRO_level-1
│   ├── HATPRO_level-2
│   ├── HATPRO_surface-met
│   ├── mcs_data
│   ├── netcdf_lidar
│   ├── raw_data
│   └── sound
├── dtu
│   ├── data
│   ├── docs
│   ├── ERA5_DATA
│   ├── landscape
│   ├── photos
│   └── plots
├── enercon
│   ├── LiDAR
│   └── NMT
├── inegi
│   ├── EnerconWindTurbine
│   ├── LeosphereWindcube
│   └── LidarAerialSurvey_RawData
├── test
├── ucar
│   ├── arl
│   ├── colorado
│   ├── cornell
│   ├── eol
│   ├── ipma
│   ├── isfs
│   ├── ncas
│   ├── notredame
│   ├── oklahoma
│   └── supporting
└── windfors
    ├── 2017
    └── cross
```

3.5 UDA's catalogue

The catalogue is build from the archive, using:

```
jlopes@windsptds:~> cat HOWTO_catalogue
# change the next 4 lines
producer="ucar"
dir="arl/ARL_TLS"
category="Ancillary"
dataset='ENERCON Acoustic Data'

# the archive & catalogue
archive="/data/perdigao/$producer"
thredds="/srv/tomcat/content/thredds"
uda="$thredds/public/catalog"

# (i) ARCHIVE: view by producer (OLD)
# if it's a new producer, add it to the catalogue
sudo ln -s $archive $uda/$producer
sudo vi $thredds/catalog_perdigao.xml #add <datasetScan>

# (ii) CATALOG: view by dataset [UDA category]
cd $uda/$category
echo sudo ln -s $archive/$dir \"$dataset\"
# and then do it
```

Stop mirroring DTU

[2020.05.23] cron jobs removed and the mirroring process stopped

```
nejoco@VIND-pNEWA04:~> cat closing_history
nejoco@VIND-pNEWA04:~> cat crons
nejoco@VIND-pNEWA04:~> /usr/bin/rsync -az --exclude-from
'sync-exclude-list' /newa/WP2/PERDIGAO/ dtu@193.136.38.237::dtu >>
sync-dtu_last.log
nejoco@VIND-pNEWA04:~> /usr/bin/rsync -az --dry-run --delete --exclude-from
'sync-exclude-list' /newa/WP2/PERDIGAO/ dtu@193.136.38.237::dtu >>
sync-dtu_last_dry-run.log
nejoco@VIND-pNEWA04:~> crontab -r
nejoco@VIND-pNEWA04:~> tar cvfz closing_history.tgz *
nejoco@VIND-pNEWA04:~> vi closing_history
```

-- jlopes