

Guidelines on how to sync your High Frequency (HF) radar data with the European HF Radar node

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CHANGE RECORD

#	Date	Description	Author (Institution)	Check by (Institution)
1	02/07/2019	1st draft of the guidelines	E. Reyes (SOCIB) P. Rotllán-García (SOCIB)	L. Corgnati (CNR-ISMAR) J. Mader (AZTI)
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EXECUTIVE SUMMARY

This document is a **step-by-step** guide to **start transferring HF radar (HFR) data** from your network **to the EU HFR node**.

The **EU HFR node** acts as the **focal point** for the European HFR data providers, implementing the HF radar data flow from the data providers to the distribution platforms ([Copernicus Marine Service](#), [EMODnet-Phys](#) and [SeaDataNet](#)).

The **main steps to be followed** are schematically summarized in [Figure 1](#). **Click on** the schema **tabs** to follow the steps:

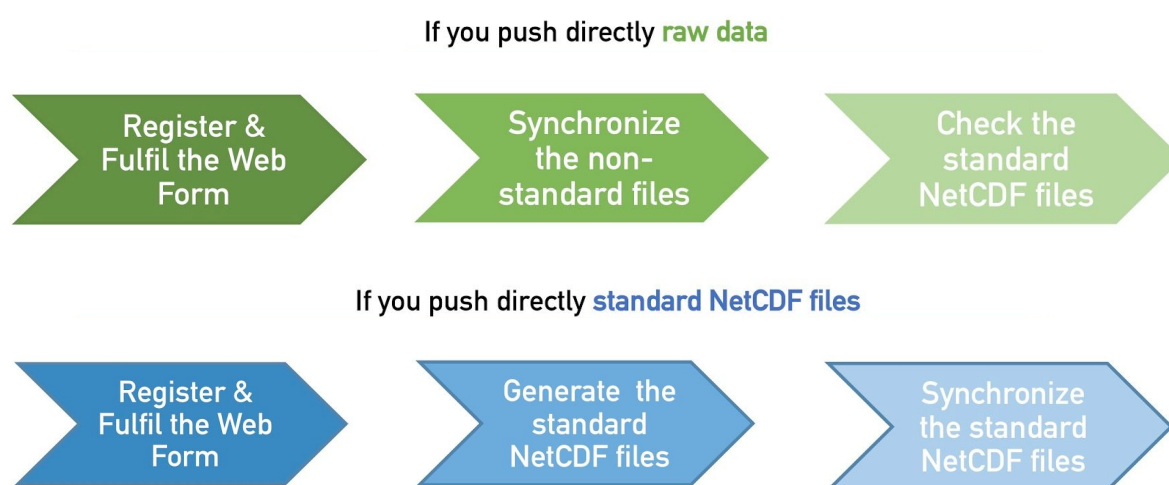


Figure 1. Workflow for the integration of HF radar data towards the EU HFR node

1. EU HFR Node - Data entry Web Form

This section guides the HF radar data provider to **register/login into the EU HFR Node Web Form** and to **fulfil the information** of the HF radar network and stations.

1.1. How to register/login

- **Visit the web:** <http://150.145.136.36/> and follow the instructions to **create your account** or go directly to the **login** area (if you are already a registered user).

1.2. How to introduce the information

- **Go to the HFR network management page** and follow the instructions available in the presentation of the [EU_HFR_Node_WebForm.pdf](#) to introduce the information about your institution, HFR network and stations.
- Please, refer to the [Jerico-Next deliverable D5.14](#) and to the [SDC_metadata presentation](#) for the meanings of the **metadata fields**.

2. HF radar data synchronization step-by-step

The EU HFR node offers different possibilities to the HFR data provider, who can provide:

- **Non-standard radial and/or total files:** the data providers must **synchronize** their near real-time native data files (**radials and/or totals**) with the EU HFR node, which will be in charge of the application of the QC tests, conversion and distribution.
- **Standard NetCDF radial and total files:** the data providers must **synchronize** their near real-time **netCDF** datasets **compliant** with the [European common data and metadata model](#) with the EU HFR node, which will be in charge of the file checking and distribution. For this purpose, the EU HFR node is sharing software tools for processing native HFR data for QC and converting them to the standard format.

To speed up the connection of all the operational European systems and guarantee a coordinated update of the dataset requirements, the **EU HFR node would highly recommend** to consider the **first option** (synchronization of non-standard native datasets).

This would initially ensure the compliance of the provided and finally published files with **minimal know-how and investment** in terms of **time and effort** on the part of the data provider. However, as mentioned before, the EU HFR node will support the data providers who want to generate locally the **Standard NetCDF radial and total files** with the shared software tools. This local production of the standard files can be settled now or afterwards when the data provider is willing to.

2.1. Non-standard radial and total files synchronization

This section explains the procedures to **transfer the non-standard radial and total raw data** from the HF radar radial stations (or central station, in the case of the totals) of the data provider **to the EU HFR node servers**. The tutorial provided here is suitable for unix-like systems where utilities like rsync (file synchronization), cron (execution of scheduled jobs) and ssh-keygen (RSA keys generation) are installed by default. The access to the EU HFR node is performed through SSH with Public Key Authentication scheme, for security reasons and in order to allow automatic login without a password.

Steps summary:

- **Data distributed:**
 - **raw radial files** mainly from CODAR SeaSonde radials (*.ruv) files or WERA radial files (.crad_ascii)
 - **raw total files** mainly from CODAR SeaSonde totals (*.tuv) files or WERA total files (.cur_asc)Examples below refer to CODAR radials and totals file names and paths.
- **Data flow:** directly **from the HFR radial sites** and from the central station (in the case of the totals) **to the EU HFR node**.
- **Data transfer:** radial and total **files are synchronized** between the HFR radial sites or the central station (source location) and the EU HFR node (destination) by a scheduled *rsync* job launched by a cron daemon on the sources locations (each one of the HFR radial sites and of the central station).

2.1.1. How to generate and submit the SSH Public Key

If an **RSA Public Key** has been previously generated for other reasons, please keep that key and jump to the last step (sending the key to the EU HFR Node). Otherwise:

- Run the **generation of an RSA key pair (Private and Public key)** in console mode with the command:

```
> ssh-keygen -t rsa
```

- The system requests entering the **filename**. Do not change the **default** filename.

```
> Enter file in which to save the key $HOME/.ssh/id_rsa).
```

- The system requests a **passphrase**. Leave it **empty**.

```
> Enter passphrase (empty for no passphrase):
```

- Check if the **new keys** (id_rsa and id_rsa.pub) have been **created** in your system :

```
> ls -lart $HOME/.ssh/
```

- **Send the public key (id_rsa.pub)** to the EU HFR node (<mailto:lorenzo.corgnati@sp.ismar.cnr.it>)

- **Check manually** if you can successfully **login** with the command (once the EU HFR Node administrator has confirmed the receipt and the installation of your public key):

```
> ssh user_name@150.145.136.27
```

2.1.2. How to synchronize non-standard radial files

- **Edit the cron table** in console mode with the command **crontab** at your **HFR radial sites**:

```
> crontab -e
```

- Add the following line to automatically **transfer the measured radials** from the HFR radial sites to the EU HFR node, every 15 minutes:

```
*/15 * * * * rsync -rltvz --no-o --no-g -e ssh --progress --stats  
$input_Radial_Meas/Radials*. * user_name@150.145.136.27:$output_Radial_Meas  
--log-file=$log/rsync_Radial_Meas_EU_HFR.log
```

- **\$input_Radial_Meas**: Folder with measured radials in near real time (e.g. for CODAR radials: /Codar/SeaSonde/Data/Radials/MeasPattern/RDLm*.*)

- **user_name**: name of the username in the EU HFR node: to be asked for to the EU HFR Node (<mailto:lorenzo.corgnati@sp.ismar.cnr.it>)
- **\$output_Radial_Meas**: folder in the remote server where the radials will be stored by the EU HFR Node (<mailto:lorenzo.corgnati@sp.ismar.cnr.it>)
- **\$log**: directory for diagnostic files (*.log)

2.1.3. How to synchronize non-standard total files

- **Edit the cron table** in console mode with the command **crontab** at your **central station**:

```
> crontab -e
```

- Add the following line to automatically **transfer the totals** from the central station to the EU HFR node, every 15 minutes:

```
*/15 * * * * rsync -rltvz --no-o --no-g -e ssh --progress --stats
$input_Total_Files/Totals*. * user_name@150.145.136.27:$output_Total_Files
--log-file=$log/rsync_Total_Files_EU_HFR.log
```

- **\$input_Total_Files**: Folder with totals in near real time (e.g. for CODAR total files: /Codar/SeaSonde/Data/Totals/TOTL*.*)
- **user_name**: name of the username in the EU HFR node: to be asked for to the EU HFR Node (<mailto:lorenzo.corgnati@sp.ismar.cnr.it>)
- **\$output_Total_Files**: folder in the remote server where the totals will be stored by the EU HFR Node (<mailto:lorenzo.corgnati@sp.ismar.cnr.it>)
- **\$log**: directory for diagnostic files (*.log)

2.1.4. How to check file transfer history

- **The log file** will allow you to check whether the radial and/or total data has been properly transferred to the EU HFR node.

```
> watch "less $log/rsync_Radial_Meas_EU_HFR.log | grep -i '<f+++++++ Radials_'"
> watch "less $log/rsync_Total_Files_EU_HFR.log | grep -i '<f+++++++ Totals_'"
```

2.2. Standard NetCDF radial and total files synchronization

2.2.1. How to generate the standard NetCDF datasets

- **Send the IP address** of your processing server to the EU HFR node (<mailto:lorenzo.corgnati@sp.ismar.cnr.it>), in order to have **granted the access to the database** of the Data Entry Web Form. Type the following in the console to get your external IP. **The IP shall be static.**

```
> curl https://ipinfo.io/ip
```

- **Download the software** for processing the HF radar files. You have [two options](#) depending on your programming skills and preferences:
 - **EU_HFR_NODE_Tools** (Matlab): DOI: [10.5281/zenodo.2639555](https://doi.org/10.5281/zenodo.2639555). This DOI represents all versions, and will always resolve to the latest one. Please, follow the [instructions](#) and [dependencies](#).
 - EU HFR NODE **JRadat** (Java) tool: <https://github.com/llasensio/JRadat>. The [manual of JRadat](#) is available also in the Github repository.

2.2.2. How to generate and submit the SSH Public Key

- Run the **generation of an RSA key pair (Private and Public key)** in console mode with the command:

```
> ssh-keygen -t rsa
```

- The system requests entering the **filename**. Do not change the **default** filename.

```
> Enter file in which to save the key $HOME/.ssh/id_rsa).
```

- The system requests a **passphrase**. Leave it **empty**.

```
> Enter passphrase (empty for no passphrase):
```

- Check if the **new keys** (id_rsa and id_rsa.pub) have been **created** in your system :

```
> ls -lart $HOME/.ssh/
```

- **Send the public key (id_rsa.pub)** to the EU HFR node (<mailto:lorenzo.corgnati@sp.ismar.cnr.it>)

- **Check manually** if you can successfully **login** with the command (once the EU HFR Node administrator has confirmed the receipt and the installation of your public key):

```
> ssh user_name@150.145.136.27
```

2.2.3. How to synchronize the standard NetCDF datasets

- **Edit the cron table** in console mode with the command **crontab** at your **processing station**:

```
> crontab -e
```

- Add the following line to automatically **transfer the standard NetCDF** from the processing station to the EU HFR node, every 15 minutes:

```
*/15 * * * * rsync -rltvz --no-o --no-g -e ssh --progress --stats  
$input_NetCDF/HFR-Network-Total_YYYY_mm_DD_HHMM.nc*.*  
user_name@150.145.136.27:$output_NetCDF --log-file=$log/rsync_NetCDF_EU_HFR.log
```

- \$input_**NetCDF**: Folder with hourly standard NetCDF datasets in near real time
- user_name: name of the username in the EU HFR node: to be asked for to the EU HFR Node (<mailto:lorenzo.corgnati@sp.ismar.cnr.it>)
- \$output_**NetCDF**: folder in the remote server where the radials will be stored by the EU HFR Node (<mailto:lorenzo.corgnati@sp.ismar.cnr.it>)
- \$log: directory for diagnostic files (*.log)

2.2.4. How to check file transfer history

- **The log file** will allow you to check whether the standard NetCDF datasets have been properly transferred to the EU HFR node.

```
> watch "less $log/rsync_NetCDF_EU_HFR.log | grep -i '<f++++++  
HFR-Network-Total_YYYY_mm_DD_HHMM_'"
```

3. Standard NetCDF files generated by the EU HFR node

Once the standard NetCDF files have been generated by the EU HFR node, you are kindly requested to **access your data** and to **check the consistency** of the outputs.

As a data provider, you have the **right expertise and the knowledge of the content of**

your data to easily find if the data are incorrect or out of date. Frequent communication with data providers will be also promoted by the EU HFR node.

3.1. How to access to the NetCDF standard files

- **Access** to the EU HFR node THREDDS Catalog: http://150.145.136.27:8080/thredds/HF_RADAR/HFradar_catalog.html and find your network.

3.2. How to assess your NetCDF standard files

The **following checks** are **recommended**:

- **HF radar surface currents** and **spatial coverage**: plot your data!
- **Bounding box**: compare the bounding box specified in the EU HFR Web Form with the one defined by the global attributes of the NetCDF files.
 - geospatial_lat_min
 - geospatial_lat_max
 - geospatial_lon_min
 - geospatial_lon_max

For this, you can **use your own tools** or those developed in the frame of 2019 CMEMS IBI training workshop regarding in situ observations ([here](#)).

If you find **any errors** in your data, **please contact** the EU HFR node by [email](#)

4. Organization profile: keep it updated in SeaDataNet

The [Dashboard from marineinsitu.eu](#), fetches once a month the information relative to the platforms providers (WWW and logo) using **SeaDataNet services** based on the **EDMO code**, as the identifier of your institution.

In particular the next service is used to populate the providers info in the popup:

http://seadatanet.maris2.nl/webservices/edmo/ws_edmo_get_detail/n_code/<edmocode>

where the **<edmocode>** is the identifier of the institution; i.e for SOCIB: 3410:

http://seadatanet.maris2.nl/webservices/edmo/ws_edmo_get_detail/n_code/3410

- **Please, check** if the **profile** of your institution is **updated and complete**.

4.1. How to find your EDMO code

- **Visit** the web of [SeaDataNet](#)
- **Introduce** the name of your **organisation** and **country** in the search area.
- Save the **EDMO** (i.e. EDMO record id) code of your institution.

4.2. How to check your profile

- **Check the information** returned by the aforementioned service by checking the corresponding url:
 - http://seadatanet.maris2.nl/webservices/edmo/ws_edmo_get_detail/n_code/<edmocode>
- **Check** in particular that the **website and logo tags** are there linking your website and institutional logo.

4.3. How to request changes in your profile

- If your **information is out-of-date** and **non-comprehensive** enough, please, **contact SeaDataNet** (sdn-userdeskseadatanet.org) and ask for an update of your profile.
- Find next a **template**:

To Whom it may concern,

I work at <institution_name>, with associated <EDMO code>, and we would like to update our organization details at: http://seadatanet.maris2.nl/webservices/edmo/ws_edmo_get_detail/n_code/<edmo_code>/.

Please find here our institutional logo (attached) and <URL>

Many thanks in advance,

<Provider contact name>

5. Contact

- Please, do not hesitate to [contact us](#) if you have problems with any of the steps. The EU HFR node can provide you **support and instructions** when required.
- Please indicate in the **Email Subject Line**, the **title of the step** in which you have the problem.

6. How to cite

- When using these guidelines, **please use the following citation carefully and correctly**:

Reyes, E., Rotllán-García, P., Rubio, A., Corgnati, L., Mader, J., & Mantovani, C. (2019). Guidelines on how to sync your High Frequency (HF) radar data with the European HF Radar node (Version 1.2). *Balearic Islands Coastal Observing and Forecasting System, SOCIB*. <https://doi.org/10.25704/9XPF-76G7>

- When providing a link to these guidelines, **please use the DOI** DOI: [10.25704/9XPF-76G7](https://doi.org/10.25704/9XPF-76G7) (digital object identifier) in order to guarantee that the original electronic document and further versions can remain accessible.