Description of the Courses on Friday 1 November 2024

Choice #1: Radar altimetry by Adrien Paris, Taina Conchy and Benjamin Kitambo
Session of 3h (one morning, one afternoon, similar)

Objectives:

Satellite radar altimetry is now a robust method for observing water levels of inland water bodies all over the world. Decades of research have fostered the use of such observation for near real time monitoring of inland waters, including lakes, large rivers and streams and smaller reaches, and also for long term monitoring since time series can extend back to the 90's. While some online databases provide freely available data updated on a daily basis thanks to automatic processing procedures, there is still the need of improving such automatic procedures and sometimes a manmade treatment remains necessary.

This small course will provide the necessary information for:

- finding the path to download the raw data (GDR, geophysical data record) to be processed and understand the availability of data in the area of interest;
- understanding the variables that can be used to discriminate water/nowater observations and the uncertainties underlying the processing of data;
- handle the Altis free software to convert raw data into water levels time series.

A short theoretical presentation will be given on satellite radar altimetry

Additional information:

At least one PC (linux/windows) per two people could be good. Previous install of Altis (under Anaconda/Python environment) is preferable: information on installation can be found here: https://gitlab.com/ctoh/altis

Please contact Adrien Paris for inquiries regarding the installation issues. During the course, a dataset will be provided for example and processing; but everyone is free to previously download data on their area of interest here: https://www.legos.omp.eu/ctoh/catalogue/?uuid=ed87f0ff-402a-4424-aad2-b4255551986c.

Previous (and free) registration is requested, see upper left signin button).

It is also preferable to come with independent data (in situ for example) for comparison.

The groundtracks (theoretical trajectory of the satellite) of the reference missions can be found here: https://www.aviso.altimetry.fr/en/data/tools/pass-locator.html.

Attendees can pre-localize interesting crossings between the groundtrack and their water body of interest, identify the satellite/groundtrack number and download adequate data, so that they work directly on their own case during the course.

Commentaries:

Group work is OK, so in this way, we recommend that at least one computer for each 2 or 3 people is brought with Altis software installed.

Choice #2: SWOT by Santiago Pena Luque, Daniel Moreira, Alice Fassoni, Fabrice Papa, Delphine Leroux
Session of 3h (one morning, one afternoon, similar)

Objectives:

The aim of this training session is to explain SWOT principles of measurements for Hydrology and to show concrete examples over the Amazon basin.
For the first part, we will explain the hydrological products (River, Lakes) and some description of the 3D measurements (Pixel Cloud). Then, we will propose a demo on Hydroweb.next platform to explore different datasets and time series.
On the second part, we have prepared several notebooks to play with River, Lake and Pixel Cloud Data, in order to show its scientific and operational interest.

Additional information:

A personal computer with internet connection is required.
If you want to replay our scripts you will need some prerequisites:

- Registration (new user) on EarthAccess: **https://urs.earthdata.nasa.gov/**
- Registration (new user) on Copernicus Jupyterlab: **https://dataspace.copernicus.eu/analyse/jupyterlab**
- Download notebooks and files from folders "*03_Notebook_Rivers_and_Lakes*" and "*4_Notebook_Pixel_Cloud*" in: **https://drive.google.com/drive/folders/1gbgi1Mndj-NcGNW1s2AoyHbKJecOIFMq?usp=drive_link**
- Upload notebook and files on the Copernicus Jupyterlab on the "mystorage" folder.
- **Optional:** Create a new profile (registration) on Hydroweb.next : **https://hydroweb.next.theia-land.fr**

Choice #3: Water Resources Applications by Rodrigo Paiva Leonardo Lapeilt, IPH), Laetitia Gal (Hydro-Matters)
Session of 3h (one morning, one afternoon, similar)

Objectives:
This short course will demonstrate a set of tools for water resources analyses based on multiple hydrological models and remote sensing tools. The tools include the: intro to MGB hydrological model and tools, a Dataset for projections of multiple climate change impacts in hydrology of South American, the new South American DEM (ANADEM) and the GEE Surface Energy Balance Algorithm for Land (GEE Sebal).

Additional information:
A computer is needed, as well as an internet connection. QGIS (https://www.qgis.org/download/) or similar GIS software is needed for part of the analyses.

Choice #4 Rainfall Estimation by Remote Sensing provided by Rômulo Oliveira, Sly Wongchuig and Paulo Kuhn
Session of 3h (one morning, one afternoon, similar)

Objectives: The objective of this course is to give an overview of the theory behind remote sensing based precipitation products, such as type of sensors, type of orbital satellites, characteristics such as spatial and temporal resolution of the most used products in South America, as well as potential applications in water resources. For this minicourse we will focus on the state-of-the-art of Level-3 precipitation products (research and operational versions). At the end of this short training course, the student, besides understanding the theoretical basis, will be able to download, manipulate and analyze information from some remote sensing databases of gridded precipitation. As well as perform a validation with data from in-situ rainfall gauges of the Brazilian National Water Agency (ANA) network.

Additional information:
At least one PC (Windows or Linux), with internet access, per two people could be good. Previous install of Anaconda/Python environment.
Previous install of QGIS (https://www.qgis.org/download/) and MGB plugin (https://mega.nz/file/h41GmAqC#24UIt8lSqnLEZho_8GfeGzjz4ajQWutUX5pIW7lhm2Y) for In-situ ANA data acquisition.