



PolSAR Practice Session: Instructions

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Aim of the practice session:

- Dual-pol SAR data processing in SNAP and Anaconda python environment.
- Implementation of crop biophysical parameter estimation and mapping algorithms in SNAP (with snappy)
- Dual-pol descriptors for target characterization and mapping.

Note: Although demonstrations will be on Windows system, Linux or Mac systems can be equally used to run several algorithms in SNAP.

A. Software installation:

1. Installing SNAP:

First download SNAP 9.0.0 (<https://step.esa.int/main/download/snap-download/>)

Here you can download the latest installers for SNAP and the Sentinel Toolboxes.
 Data provision is available to all users via the [Sentinel Data Hub](#)

Current Version
 The current version is 9.0.0 (29.06.2022 15:00 UTC).

For detailed information about changes made for this release please have a look at the release notes of the different projects: [SNAP](#), [S1TBX](#), [S2TBX](#), [S3TBX](#), [SMOS Box](#), [PROBA-V Toolbox](#)

We offer three different installers for your convenience. Choose the one from the following table which suits your needs. During the installation process, each toolbox can be excluded from the installation. Toolboxes which are not initially installed via the installer can be later downloaded and installed using the plugin manager. Please note that SNAP and the individual Sentinel Toolboxes also support numerous sensors other than Sentinel.

If you previously used SNAP before, we recommend uninstalling the older SNAP version before installing the latest version.

	Windows 64-bit	Mac OS X	Unix 64-bit
	These installers contain the Sentinel-1, Sentinel-2, Sentinel-3 Toolboxes, download size is close to 900MB.		
Sentinel Toolboxes	Main Download Mirror Download	Main Download Mirror Download	Main Download Mirror Download
	These installers contain only the SMOS Toolbox, download size is close to 500MB. Download also the Format Conversion Tool (Earth Explorer to NetCDF) and the user manual .		
SMOS Toolbox	Main Download Mirror Download	Main Download Mirror Download	Main Download Mirror Download
	These installers contain the Sentinel-1, Sentinel-2, Sentinel-3 Toolboxes, SMOS and PROBA-V Toolbox, download size is close to 1GB.		
All Toolboxes	Main Download Mirror Download	Main Download Mirror Download	Main Download Mirror Download

Thanks to the open-source license, we create the SNAP installers with the [multi-platform installer builder](#) installed from ej-Technologies.

First install SNAP (no python path configuration is required at this time) downloaded from ESA repository. We used SNAP 64 bit version for Windows Operation system. General SNAP installation directory is `C:\Program Files\snap`



2. Installing Anaconda

Download Anaconda 3 from

https://repo.anaconda.com/archive/Anaconda3-2022.05-Windows-x86_64.exe

Install Anaconda3 in `C:\Anaconda3` directory.

Don't install Anaconda in default directory

It should be 64 bit and Python3.6 supported.

3. Configuring SNAP with Anaconda python environment

Setup development environment for SNAP

- i. Open Anaconda Command prompt with Administrator
- ii. Add Community package management system

```
conda config --prepend channels conda-forge
```

- iii. Create a new anaconda environment. We are using Python 3.6 for this example.

```
conda create -n snappy36 python=3.6  
conda activate snappy36
```

where `snappy36` is the name of the environment, and the python version is 3.6. Then we activate the environment by using its name `snappy36`. This will create a new environment inside the Anaconda directory as `C:\Anaconda3\envs\snappy36`

- iv. Next, cd into the SNAP installation directory. Then run the following command.

```
>> cd C:\Program Files\snap\bin  
>> snappy-conf C:\Anaconda3\envs\snappy36\python.exe  
C:\Anaconda3\envs\snappy36\Lib
```

Here `C:\Anaconda3\envs\snappy36\python.exe` is the virtual environment python executable, and `C:\Anaconda3\envs\snappy36\Lib` is the directory where snappy will be installed.

- v. Installing additional packages in the current Anaconda `snappy36` environment. It may include `numpy`, `scikit-learn` which are commonly used in model developments and image processing. (Must have opened Anaconda cmd with admin privileges)



```
>> conda activate snappy36
>> conda install numpy
>> conda install scikit-learn
>> conda install -c conda-forge matplotlib
```

vi. Now close Anaconda command prompt.

vii. Now, we are ready to do the development with snappy. To confirm that everything is working correctly,

First open Anaconda cmd (no Admin privileges are required)

```
>> conda activate snappy36
>> cd to snappy directory
(C:\Anaconda3\envs\snappy36\Lib\snappy)
>> python
>> import snappy
```

Resources:

- <https://senbox.atlassian.net/wiki/spaces/SNAP/pages/19300362/How+to+use+the+SNAP+API+from+Python>
- SNAP Anaconda Installation or configure: <https://thegeoict.com/blog/2019/08/21/setup-development-environment-for-snap/>

B. Data download:

Download all datasets from the shared drive link. (Approximately 300 Mb volume)

<https://tubcloud.tu-berlin.de/s/MXR9kCXR2t3nrRQ?path=%2FPoISAR%2FPractice%20Session%2FData>

C. Codes:

Download all codes from the shared drive link.

<https://tubcloud.tu-berlin.de/s/MXR9kCXR2t3nrRQ?path=%2FPoISAR%2FPractice%20Session%2FCodes>

OR

<https://github.com/mrslabiitb/GRSS-IADF-School2022>