InSar challenge detectives

Differential InSar techniques to analyze rapidly changing terrain

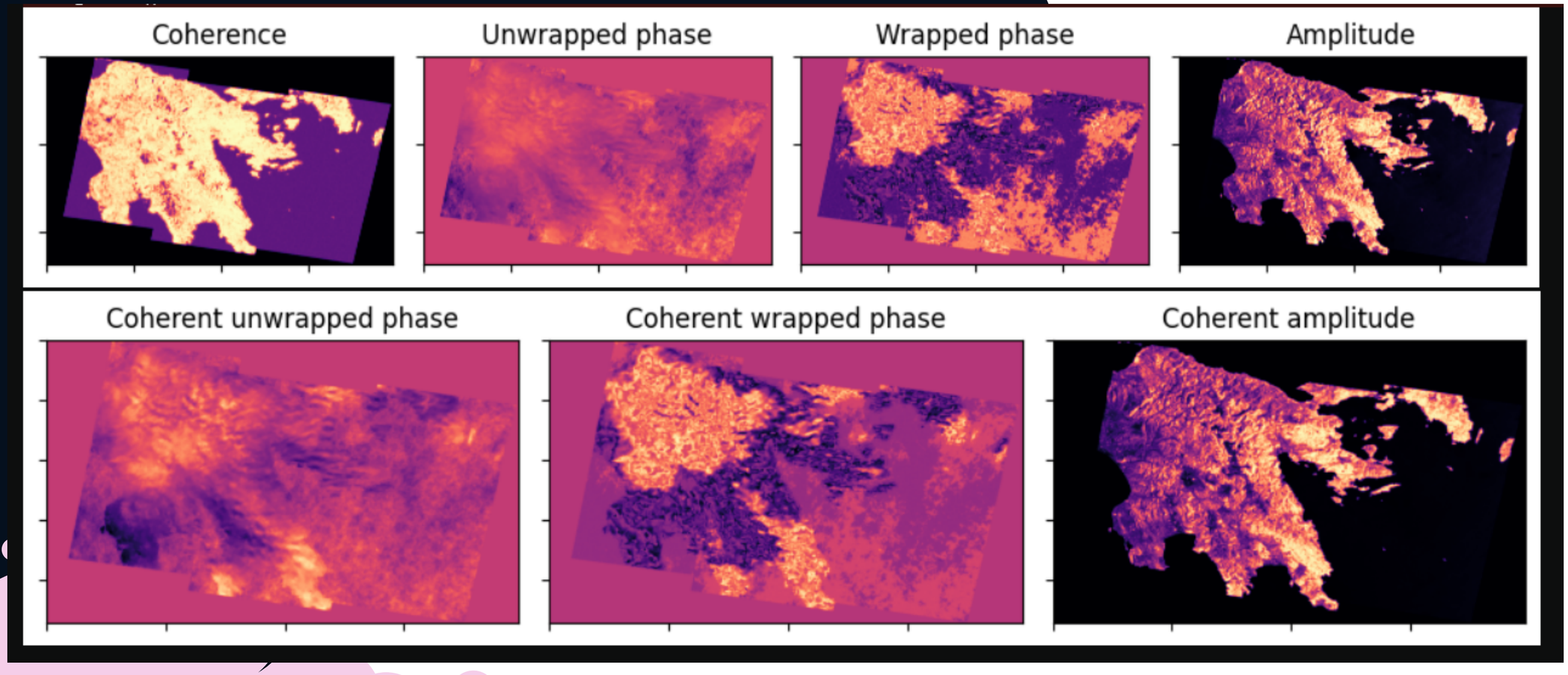
GNU/Linuxers

What is our challenge?

Our challenge was to come up with an algorithm to remove the tropospheric signal, wihich produces noise, form various radar datasets so the resulting signal can be used to study small deformations of the Earth's surface

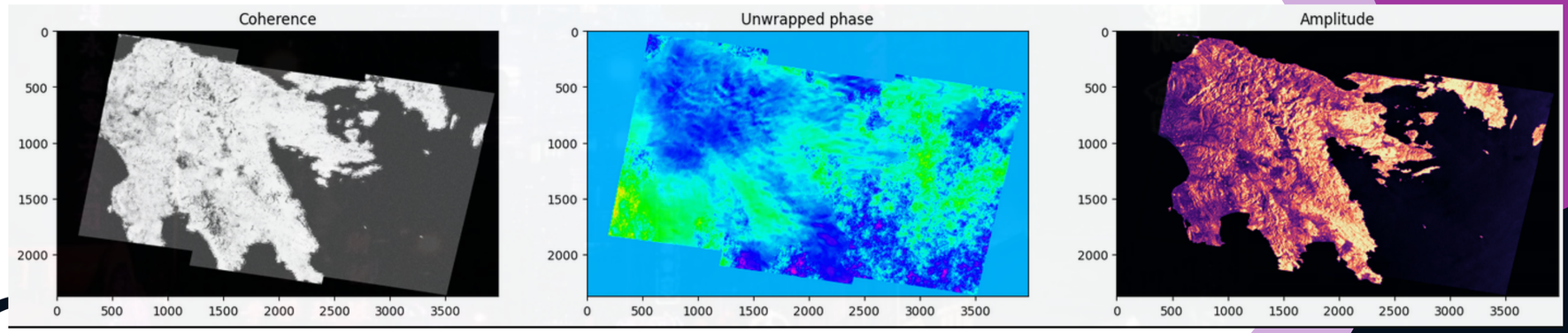
We chose this challenge because we liked the idea of working with signals and representing different parts of the Earth's surface. Furthermore we thought it was an interesting challenge and that it had an useful application

The begginings

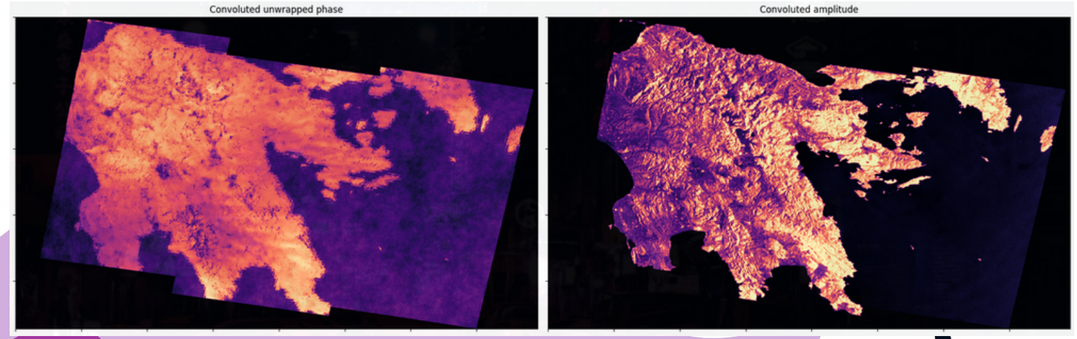


Filter process

Raw data

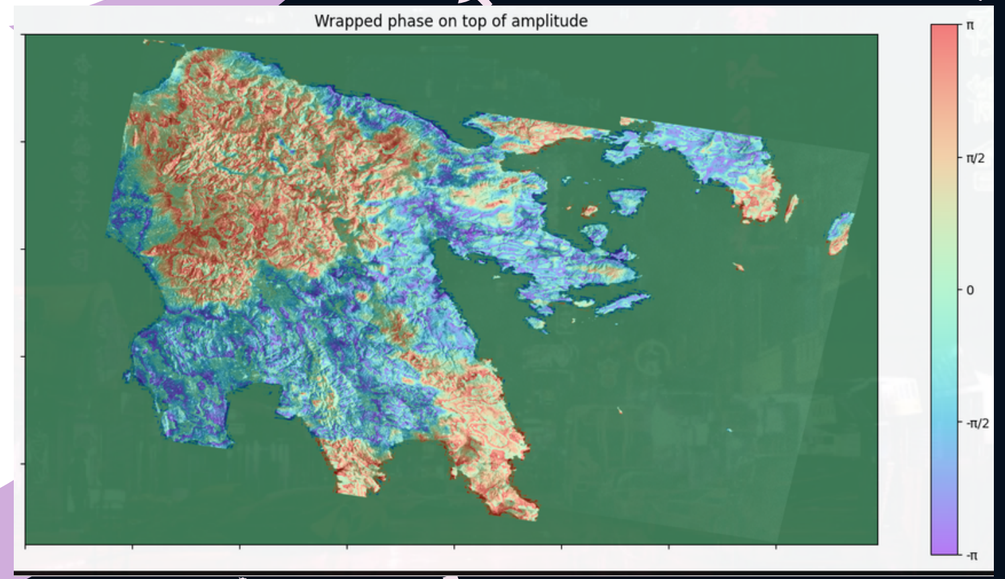


Coherent data



Filtering

Interferogram

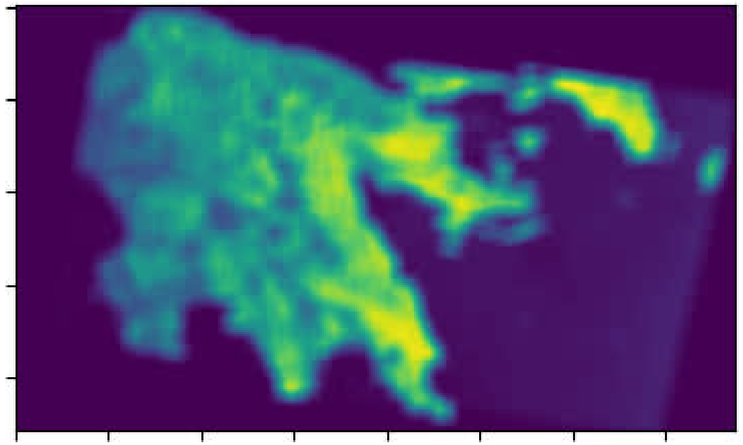


Algorithms

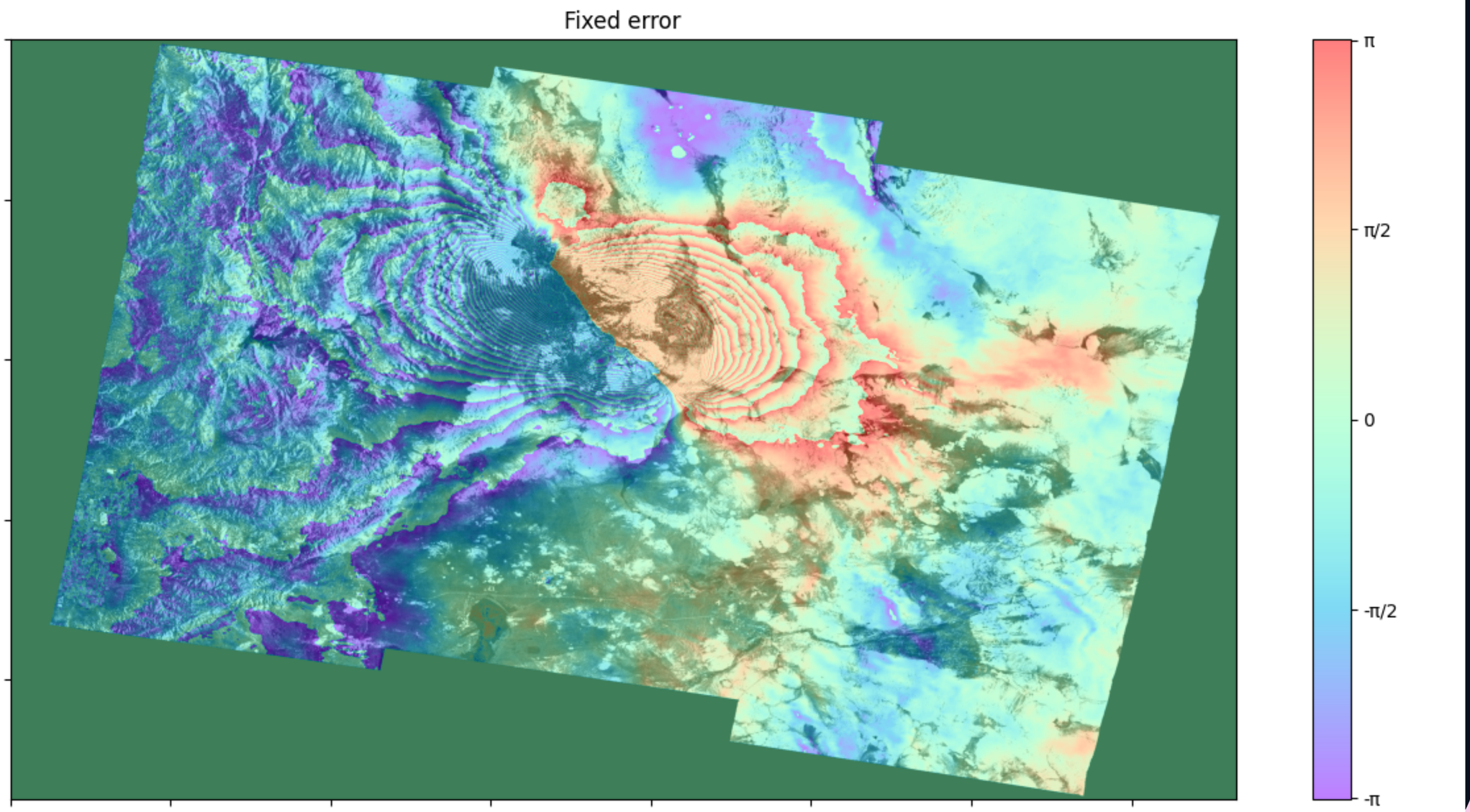
We implemented the convolution algorithm that reduces the noise in the image making an average weighted by the kernel points.
Using a kernel calculated with the exponential function we get a good reduction of noise without losing too much data.

Some algorithms we used are:

- Convolution algorithm
- Convolution algorithm with kernel
- Frost's algorithm
- Space-time filtering algorithm**



The usual time filtering methods from InSAR are not suitable for our prolems, since they assume constant data over time.**


Fixed error
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Bibliography

Synthetic Aperture Radar Land Applications Tutorial, {"https://earth.esa.int/documents/10174/2700124/sar_land_apps_1_theory.pdf", by ESA, UNESCO Bilko, sarmap}

ASF Sentinel-1 (S1) InSAR Dataset {"https://search.asf.alaska.edu/#/?dataset=SENTINEL-1%20INTERFEROGRAM%20(BETA)"}