NOA inputs for D10.8 Tools for submission, validation and access to data, metadata, and products

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NOA plans to develop a software (strain-tool) to compute Strain and/or Strain Rate parameters based on GNSS-derived tectonic velocities from partners CNRS / INGV and FOMI. This work is part of the Task 6 products for EPOS. The tool will apply recommendations set in **[1}**

The software is expected to be released during May 2018. The first version will be the development of a stand-alone program; after testing and validation, version 2 will be released which will be a web service setup, utilizing the developed libraries.

In addition, NOA will produce strain-rate maps for Eurasia (principal strain axes – dilation rate – rotation rate) using a) the VISR **[2**] and b) STIB **[4]** algorithms and compare results with similar products to be prepared by LM. This work is expected to produce first results by end of April 2018.

1. Software characteristics

- The software will be free and open-source.
- Development will be performed using github (https://github.com/).
- All interested parties will be able to download (clone) the software from github https://github.com/DSOlab/StrainTool and make (local) changes.
- The language of choice is Python; despite the fact that Python2.x and Python3.x are not fully compatible, effort will be made to make the software independent of the language version.
- Any third-party software used, will be free and open-source.

2. Implementation

The software shall be able to read in GNSS-derived information (including station name, station coordinates, station tectonic velocities, standard deviations and correlation coefficients) from ascii text files (see [***1***]). [***1***] implies that the optimal algorithm for deriving strain rate patterns (given the specific needs of EPOS), is described at [***2***]. Hence this will be the algorithm implemented within the software. Additionally, an alternative algorithm will also be available, namely the one described at [***3***].

The output will be the list of estimated parameters and shall be written to ascii text files.

Special care will be taken, to also output parameters related to the plotting of strains/strain-fields (oriented towards using the Generic Mapping Tools software (http://www.soest.hawaii.edu/gmt/).

The proposed work flow is depicted in Fig. 1 below.

3. References

[***1***] Contribution to EPOS-IP WP10 STRAIN PRODUCT, Task 10.6 GNSS Products - Guidelines for DDSS Strain-rate derivation maps, A. Ganas, K. Chousianitis, version: 20 December 2016

[***2***] Shen, Z.-K., M. Wang, Y. Zeng, and F. Wang, (2015), Strain determination using spatially discrete geodetic data, Bull. Seismol. Soc. Am., 105(4), 2117-2127, doi: 10.1785/0120140247.

[***3***] Veis, G., Billiris, H., Nakos, B., and Paradissis, D. (1992), Tectonic strain in Greece from geodetic measurements, C. R. Acad. Sci. Athens, 67:129—166.

[**4**] Masson, F., Lehujeur, M., Ziegler, Y., and Doubre, C. (2014). Strain rate tensor in Iran from a new GPS velocity field. Geophys. J. Int., 197(1) :10–21

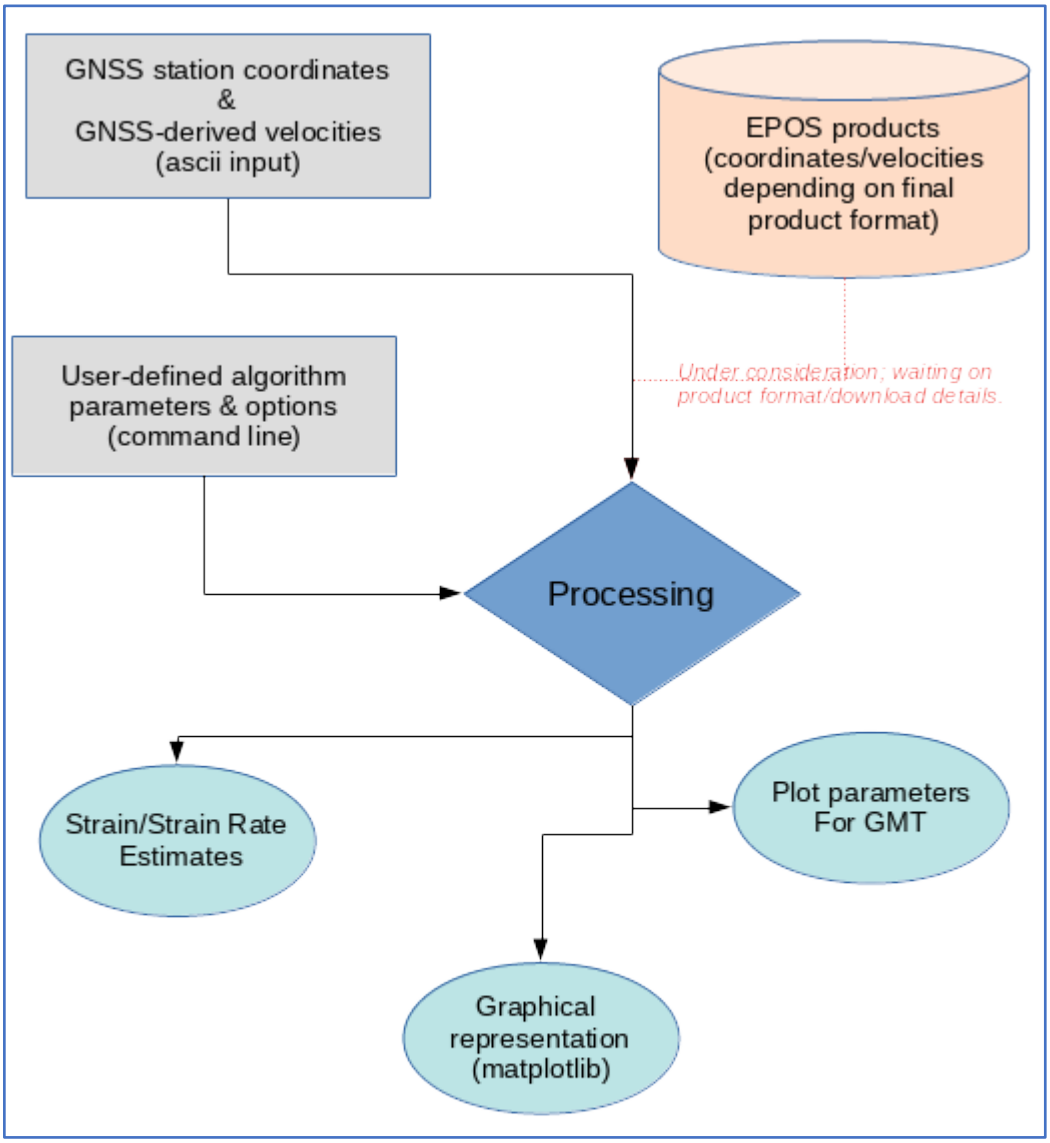

Figure 1. Schema of work flow.