Planning DSO contribution to EUREF densification project.

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DSO Recent Activity

Dionysos Satellite Observatory (DSO) and Higher Geodesy Laboratory of the National Technical University of Athens, have developed an automated processing scheme to accommodate the routine analysis of all available continuous GNSS stations in Greece.

This daily analysis process, is implemented for the last two years, yielding results which help us further understand the complicated tectonic setting of Greece and nearby regions.

Important results, include:

- the recent volcanic activity in *Santorini* (e.g. [2]),
- the 2014 *Kefallonia* earthquakes (e.g. [4], [3])

SEISMO Project

In the framework of the SEISMO[1] Project, platform has been upgraded, to include:

- more GNSS stations, divided into sub-networks,
- manipulation, archiving & dissemination of GNSS data files,
- new processing capabilities (e.g. GPS+GLONASS processing),
- automatic archiving and publishing of results (via a dedicated web-site),
- integration with `GSAC` ([5]) and `MySQL` databases,
- new results and products

The platform was in practice re-designed & re-implemented.

[1] South Aegean Geodynamic And Tsunami Monitoring Platform

Status

Motivation

- expand & modernize our research activity,
- contribute to the GNSS community,

Data

What we process

Currently we process whatever we can get our hands on ...
Problems:

- Inhomogenous dataset (`RINEX`, raw files, etc).
- Various maintainers, different mentalities.
- Different aquisition methods/rates.
- Hardly any log files.
- Wide variety of equipment (not always included in `atx` files).

COMET/NTUA Network

Network installed/maintained by COMET[2] & NTUA.

- established along the Aegean Arc
- homogenous (geodetic type) equipment
- credible time-span (early 2004 - late 2011)
- data aquisition stoped at late 2011
- equipment is old & GPS-only
- needs repairing

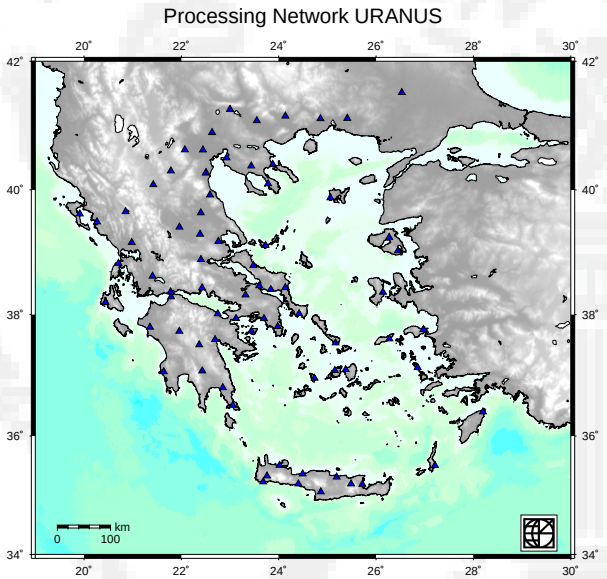


Figure: Flowchart of the processing scheme.

Can be used for EUREF densification 'as is'.

[1] Center for Observation and Modeling of Earthquakes, http://comet.nerc.ac.uk/

NOA/GEIN and others

Network maintained by GEIN/NOA[3]. Sites established by various institutes (NTUA, UNAVCO, MIT).

- covers (sparsely) all of Greece
- credible time-span (newest stations at 2012)
- inconsistent providers (for some stations)
- no log files

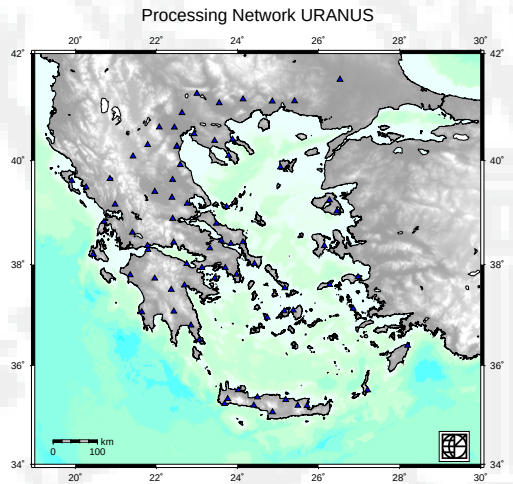


Figure: Flowchart of the processing scheme.

Unusable sites: atal, stef, ?? (no calibration).

[1]National Observatory of Athens

http://www.gein.noa.gr/services/GPS/noa_gps.html

Tree-Compant / URANUS

Network installed/maintained by `Tree-Company`[4].

- dense network, covers all of Greece
- homogenous (geodetic type) equipment
- limited time-span (late 2013 onwards)
- no log files
- comercial usage oriented

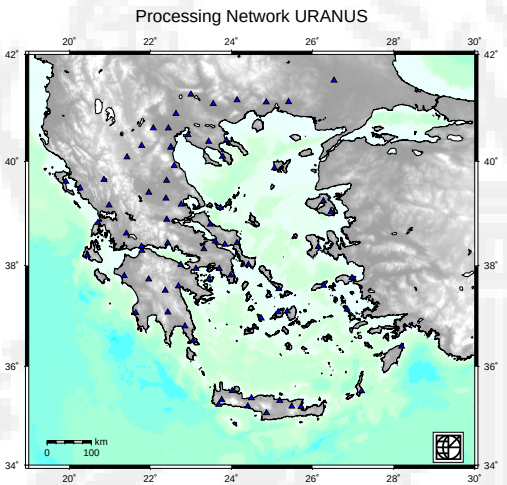


Figure: Flowchart of the processing scheme.

Can nonly use ones with time-span $>$ 2 years ($\sim$??).

[1] URANUS network `http://www.uranus.gr/`

HEPOS

Network installed/maintained by HEPOS[5](Greek Cadastre Service).

- dense network, covers all of Greece
- homogenous (geodetic type) equipment
- credible time-span (late 2013 onwards)
- limited access (∼5 stations)!!

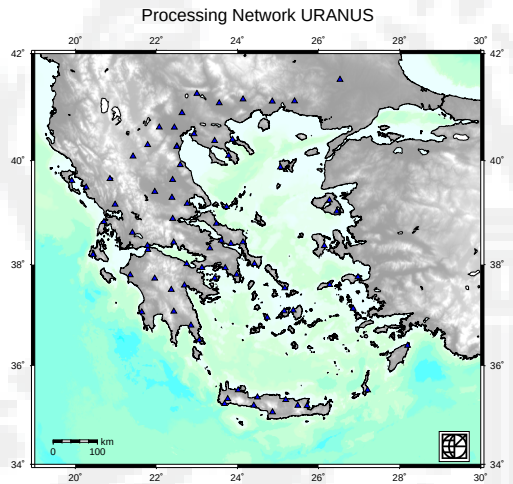


Figure: Flowchart of the processing scheme.

Can only use somewhere between 5 and 10 sites for a time-span of ∼ 4 years.

[1] http://www.hepos.gr/

Localised Networks

Network installed/maintained by CRLab[6].

- credible time-span
- only covers the Corinth Rift
- inconsistent providers
- no log files & equipment changes

Santorini Network.

- localized
- limited time-span

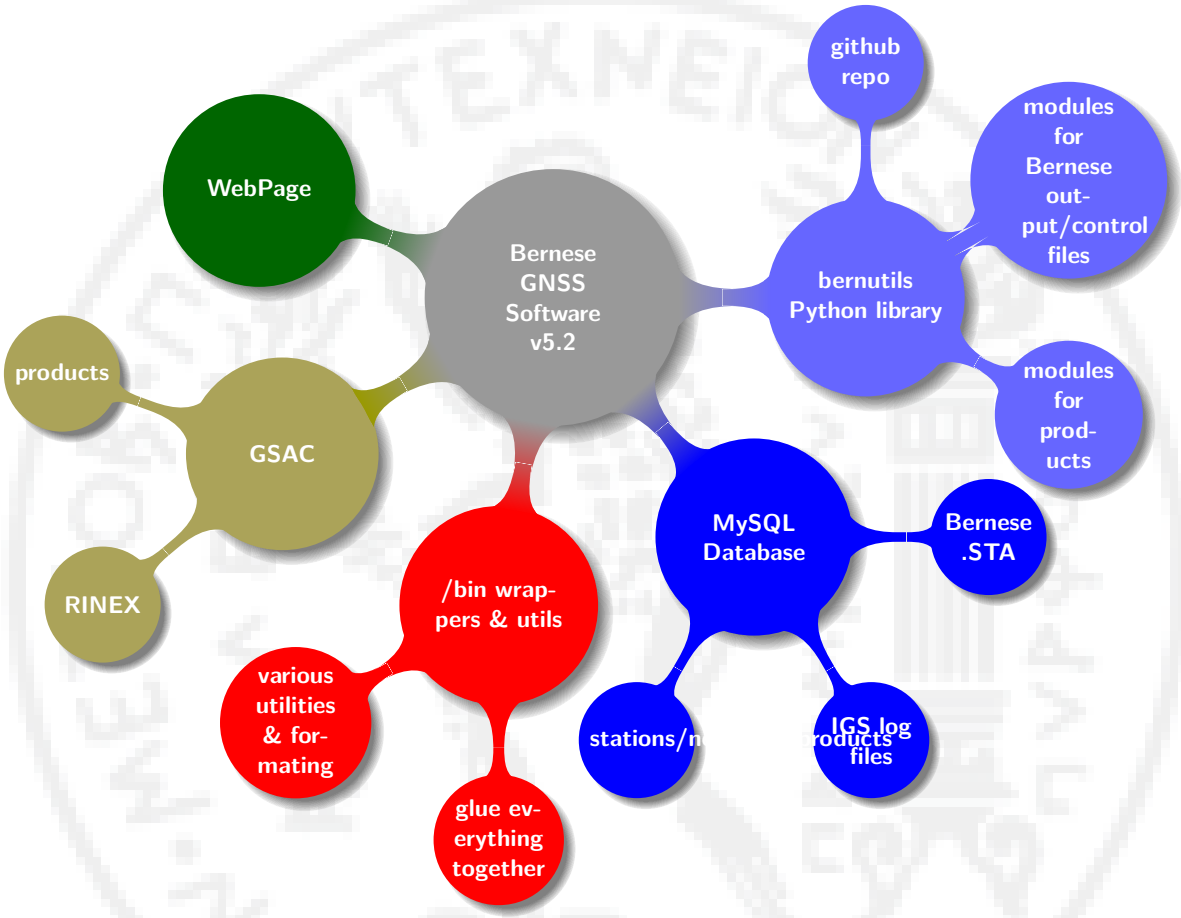
[1] Corinth Rift Laboratory http://webobs.crlab.eu/

The Scheme

The core tool/software is `Bernese GNSS Software v5.2`[?].

Integration with

- `MySQL` database,
- `Python` library
- `GSAC`
- wrappers (`shell`)

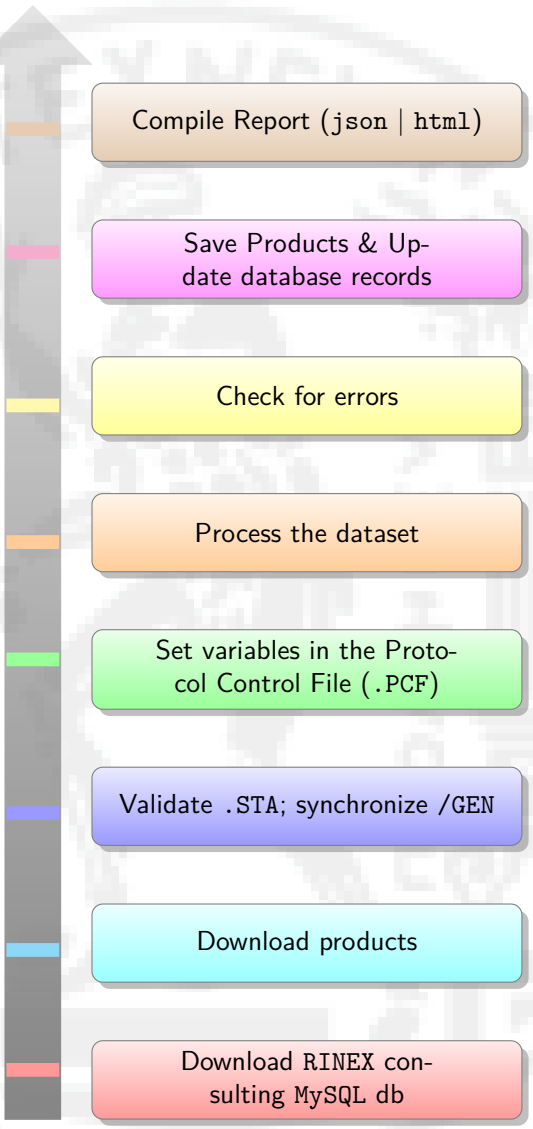


Outlook

- check station information file consistency (against the provided in `CODE`'s ftp)
- synchronize `GEN/` directory
- closely follow `RNX2SNX.PCF`
  - variabes in PCF are set by external tools (genericity)
  - skip copying/moving/removing; replace with tools that interconnect with `MySQL`
- update database
- customize output (`html, json`)

Workflow

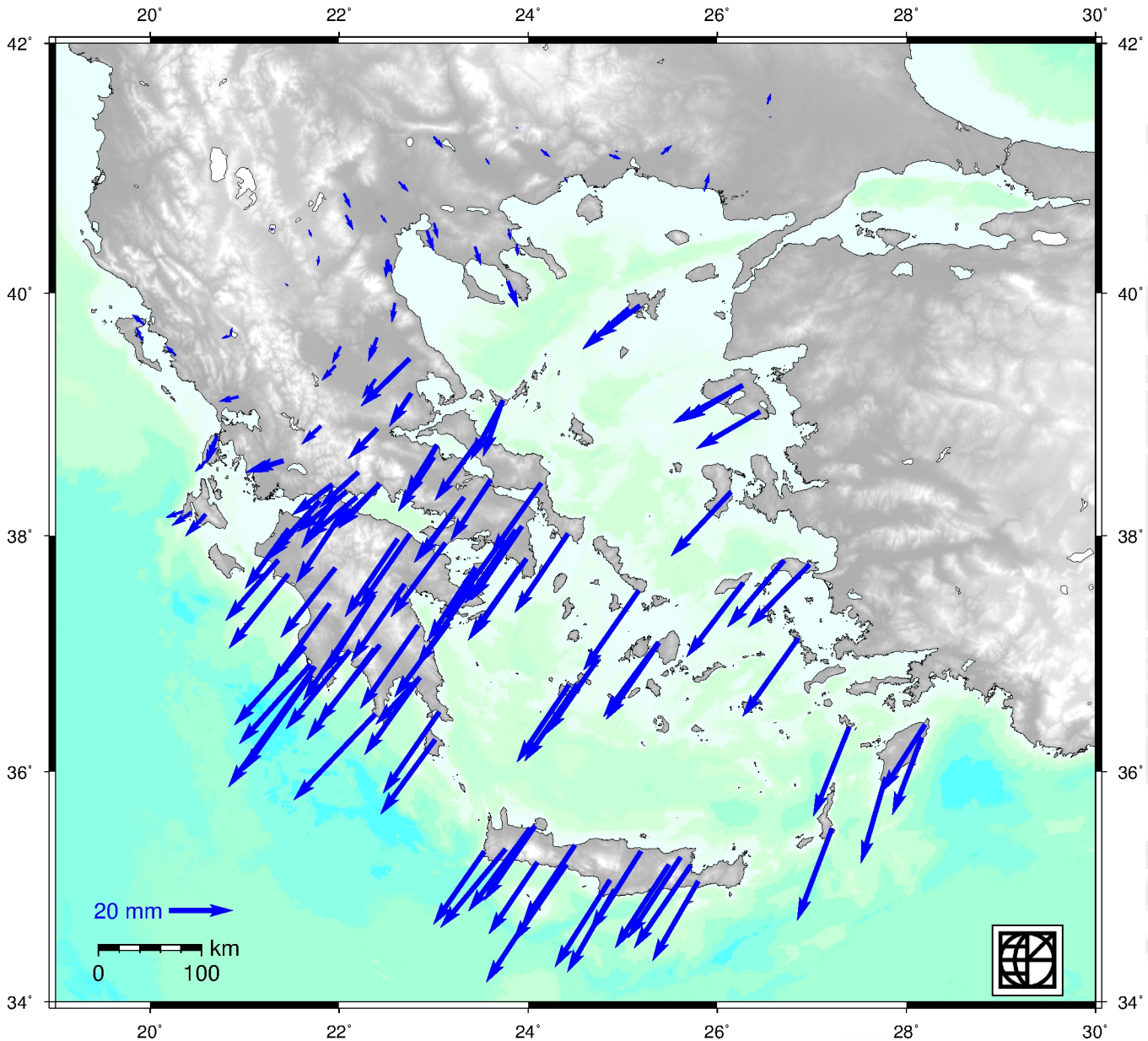
```
$>ddproces.sh --year=
--doy= --session=
--bern-loadgps=
--campaign=
--satellite-system=
--solution-id=
--save-dir=
--analysis-center=
--use-ntua-products=
--append-suffix=
--elevation-angle=
--update= --pcv=
```



Results & Output

JSON output

Velocity Field



Web Resources

Visit, Browse, Interact, Comment

- **Dionysos Satellite Observatory** `http://dionysos.survey.ntua.gr/`
- **GSAC repository** `http://dionysos.survey.ntua.gr/dsoportal/_datacenter/gsacrepos.html`
- **Ftp site** `http://dionysos.survey.ntua.gr/dsoportal/_datacenter/ftpdata.html`
- **Kefallonia earthquake** `http://dionysos.survey.ntua.gr/dsoportal/_projects/supersites/cephalonia/`
- **Ionospheric Remote Sensing** `http://dionysos.survey.ntua.gr/dsoportal/_projects/IonoRemSens/`

Thank you very much for your attention !

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Tectonophysics, Volumes 644–645,184-196, 2015, Pages 184-196

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The February 2014 Cephalonia Earthquake (Greece): 3D Deformation Field and Source Modeling from Multiple SAR Techniques
Seismological Research Letters, Vol.86(1), 2015

UNAVCO
GSAC – Geodetic Seamless Archive Centers: Open-source Software for Geodesy Data Repositories
available at `https://www.unavco.org/software/data-management/gsac/gsac.html`

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IGSMAIL [6663] http://igscb.jpl.nasa.gov/pipermail/igsmail/2012/007853.html, 2012

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Troposphere mapping functions for GPS and very long baseline interferometry from European Centre for Medium-Range Weather Forecasts operational analysis data
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