Corinth Rift Observatory – http://crlab.eu

Coordination meeting - Patras, June 12, 2018 (10:30-18:00)
The meeting was held at the Department of Physics of the University of Patras

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Participants

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Presentations

Introduction made by V. Anastassopoulos. Presentations made by E. Sokos, C. Evangelidis, A. Ganas, P. Bernard to show the context and the connection with EPOS and HELPOS.
An inventory of the stations is made by each team who is operating stations in the field, mostly seismological, broadband and GNSS. There is also tide gauges, strain-meters, meteorological stations and other various sensors operated in the array. See maps and description on the CRL portal http://crlab.eu
The international character of the CRL Observatory is something unique among all NFO and VO of EPOS. It represents a complexity, especially from the organisational point of view, but it constitutes also a great strength for the Europeans and the seismological community. There is a document of 2016 that analyses the impact of CRL in the literature, see http://biblio.crlab.eu

Sensors & Field equipment

Tides gauges should be more visible within the Observatory array and well integrated with the existing arrays in particular the one operated by the tsunami centre at NOA (see http://83.212.99.53/TAD_server).

Need of inventory of underground facilities within the perimeter of the Observatory, for possible future installation of sensors (*e.g.* technical galleries made for the highway and train line tunnels).

Strong motions sensors: need of inventory and better integration within the observatory.

Need of clear visibility of the sensors and data that belong to the Corinth Rift Observatory, so the corresponding data are properly cited by the science community who uses it.

Owner of stations must provide supply letters for EPOS.

The Observatory includes also meteorological sensors and the need of strong meteorological monitoring and modelling. This is needed for all remote sensing observations (*e.g.* GNSS or InSAR) and also for all aspects related to the sea level and strain changes produced by the sea level changes at high sensitivity sensors like strain-meters and tiltmeters.

Need for the whole "maintenance" team to have access to all stations for maintenance, this implies in particular sharing the keys of the stations.

Telemetry, data, data storage, mirroring

There is need of better quality control on the data that arrive from the field. There is a need of long term strategy for the payment of the 3G/4G telemetries to the mobile phone operators.
The stations are accessible in the field via a VPN. There is a need also of long term strategy for VPN in the CRL array for both the sensors and the computers used for the maintenance and automated data download.

Data should be duplicated / mirrored in an appropriate way that warrants the long term existence and safety of the data. Products should not be duplicated when they are made with same software (or method) in the partner institutions, and at the same time it is good if the partner institutions make products using different approaches, allowing better assessment of the variability of the products. The EPOS structures should be used (*e.g.* EIDA or GLASS, see more at https://www.epos-ip.org/data-services/community-services-tcs/gnss-data-and-products and https://www.epos-ip.org/tcs/gnss-data-and-products/news/glass-unique-open-access-platform-earth-sciences-research).
NOA GSAC (http://194.177.194.238:8080/noanetgsac/gsacapi/) will be kept operational until 2020 and probably later and it will continue hosting also campaign data. The Corinth Rift Observatory data can be retrieved on that portal (daily push of all CRL GNSS data to a NOA ftp repository at ftp://egelados.noa.gr)

Products

Products should comply with the EPOS guidelines. However, products can be also in a "proprietary" format that fits best with the specificities of CRL, if needed (in between the raw data and the final products). The CRL web portal is already providing many data and products.

Web portal

CRL web site to be used more by the CRL team and by the science community. It implies more publicity to be made. The CRL portal includes an intranet (called **WebObs**) for the CRL team. This WebObs permits to document, for each station, the visit and actions made at the station. To be used systematically by those who go to the field at CRL stations. The WebObs is not accessible automatically for security reasons, so you must add in your file /etc/hosts (or C:\WINDOWS\system32\drivers\etc\hosts in Windows OS) the line: **129.199.70.53 webobs.ens.fr**
Each partner involved in maintenance in the field should be able to access the WebObs. Login/Password to be requested to Alexandre Nercessian.

Governance

Yearly coordination meeting: Need of a yearly coordination meeting like that one. It could be every month of June in Patras like this time. June is better than September because it is the right time to evaluate the costs for the year N+1 and communicate those costs by early September for the preparation of the budget of year N+1. Coordination meeting in September (at the same time of the CRL School) would be too late to preparer the year N+1.

Science Council: Need of creation of a Science Council, composed of ~8 people external from the science team of the NFO. Suggestions:
- parity men/women
- one or two members from another Near Fault Observatory
- one member from a Volcano Observatory
- one member from outside the EU

In routine mode (not at the beginning) this science council could gather during the CRL Schools (September) and with possibility of visio-conferences, rather that gathering during the yearly coordination meeting of June (this to leave to the June meeting their main task which is the technical coordination).

Overall value of the Observatory

60 stations x 15k€ per station = 900k€, Computer resources in the partners laboratories (for the data management and initial products only): 60k€

Running cost of the Observatory

Yearly maintenance of the stations: 1.2k€/station (aligned on the costs for RESIF & RENAG stations): 60 * 1.2k€ = 72k€/year (this includes the cost for telemetries, consumables at the stations, and travel expenses)
The cost is globally proportional to the number of stations and some optimization is possible by collocating sensors when possible and by performing multi-sensors maintenance during visits in the field. This implies that those who go to the field know enough about the instruments of the others and the problems to be solved.

Replacement of equipment 12% per year of the total cost of equipment: 0.12 * 900k€ = 108k€/year

Computer & hard disks in the partner laboratories (at data mirroring and products realisation level): 25k€/year (the other consumable costs are included in the cost/station evaluated above).

Education / outreach (e.g. CRL Schools): 20k€/year

Support for new and specific Observatory actions: 30k€/year (this is expected to trigger funds raising for new projects)

Costs related to science council and overall governance: 15k€/year

Field campaigns: not evaluated within the Observatory costs

Publication costs: not evaluated within the Observatory costs

According to the above evaluation, the running cost of the Corinth Rift Observatory is ~270k€/year + overheads (variable between 12 and 20% depending on the partner institutions). This is without counting any manpower and this is what is needed to ensure an Observatory operational on the long term (with the broken/obsolete instruments replacements and no evolution of the overall number of instruments/stations).

EPOS and the national agencies associated to EPOS -and supporting its activity- must be aware of this cost and establish mechanisms to provide this support to the CRL partner laboratories on a recurrent basis.

Human costs for the Observatory: 2 full time for maintaining the array + 0.5 full time for quality control and early data management and backups + 0.5 full time for governance (web activity include in the activity of the last two). All this manpower is for the basic Observatory work, not for the realisation of the products.

The costs of the "services" (EPOS "services" and others) are not included in the above evaluation.

Trans National Access to the Corinth Rift Observatory

Trans National Access (TNA): The Corinth Observatory should propose TNA access to the science community. The team is strong enough for that and can provide very efficient logistical support to new teams by various means

Forthcoming actions

- This document to be presented at the NFO meeting early July in Patras
- Funding request for 2019 to be finalized and submitted to the EPOS funding partners
- Science council to be set-up and first meeting to take place in late 2018 or early 2019.
- Next coordination meeting in June 2019 with each partner presenting the state of the art of its contribution to the observatory during the elapsed year and proposed actions for the forthcoming one.

Notes & suggestions

The meeting room in the Physics Department was excellent for this kind of meeting.
It would be good to have a review of science impact and costs and economic models of all NFO and VO of EPOS to analyse the similarities / differences between the various observatories and their strengths and weaknesses.

Glossary

CNRS: Centre National de la Recherche Scientifique; CRL: Corinth Rift Laboratory; CUP: Charles University Prague; EIDA: European Integrated Data Archive; EPOS: European Plate Observing System (http://www.epos-ip.org); GLASS: Geodetic Linking Advanced Software System; GNSS: Global Navigation Satellite System; HELPOS: Hellenic Plate Observing System; InSAR: Interferometric Synthetic Aperture Radar; NFO: Near Fault Observatory; NKUA: National and Kapodistrian University of Athens; NOA: National Observatory of Athens; RENAG: Réseau National GPS; RESIF: Réseau Sismologique & Géodésique Français; TNA: Trans-National Access UPAT: University of Patras; VO: Volcano Observatory; VPN: Virtual Private Network