

# Task 7 - Surface Deformation using Space Geodesy

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## **Objective:**

To detect and quantify surface deformation during and after the eruption, using space-geodetic data and tools, namely GNSS (Global Navigation Satellite Systems) observations and InSAR (Interferometry Satellite Aperture Radar) images.

## **Tasks**

T7.1. Study of the eruptive period based on GNSS data.

T7.2. Study of the post-eruptive period based on GNSS data.

T7.3. Study of the eruptive period based in joint GNSS and InSAR analysis.

T7.4. Study of the post-eruptive period based in joint GNSS and InSAR analysis.

## **Deliverables**

D7.1 – Eruptive surface deformation field from GNSS and InSAR (M12)

D7.2 – First posteruptive surface deformation field from GNSS and InSAR (M18)

D7.3 – Final posteruptive surface deformation field from GNSS and InSAR (M30)

D7.4 – Analysis of the coordinate (latitude, longitude, altitude) timeseries of the permanent GNSS stations (M33)

# Tasks:

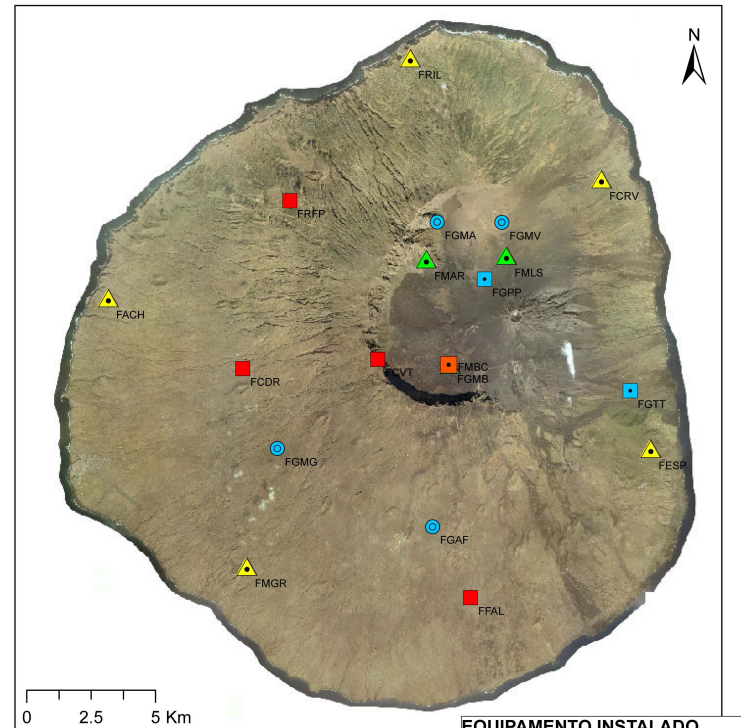
## T7.1. Study of the eruptive period based on GNSS data.

SITE	InitialProc	FinalProc	TotalFiles
FCOR	30/11/14	19/01/15	50
FEPG	01/12/14	19/01/15	49
FFIX	29/11/14	19/01/15	52
FGNB	05/12/14	03/01/15	29
FMBC	29/11/14	20/01/15	49
FMLS	03/12/14	20/01/15	49
FMRL	30/11/14	20/01/15	24

The data will be processed in static and kinematic modes in order to detect long-term and high-frequency positional variations



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 CABO VERDE



DATA: 06DEZ2014 12:00Z

**EQUIPAMENTO INSTALADO**

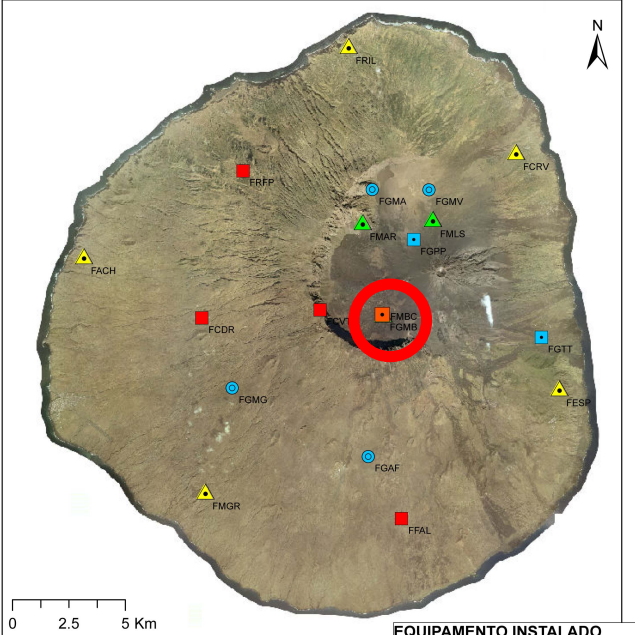
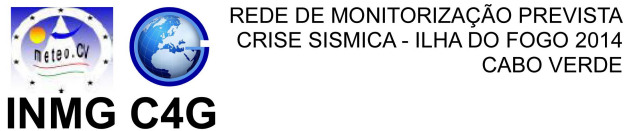
**TIPO**

- INMG SISMO + INCLINO + C4G GNSS
- INMG SISMO + INCLINO
- INMG SISMO
- ▲ C4G GNSS
- ▲ C4G GNSS + SISMO
- C4G SISMO

# Tasks:

## T7.2. Study of the post-eruptive period based on GNSS data.

FMBC has been installed a CORS permanent station  
To be consider to install a 2<sup>nd</sup> station during the duration of the project.



DATA: 06DEZ2014 12:00Z

EQUIPAMENTO INSTALADO	
TIPO	
■	INMG SISMO + INCLINO + C4G GNSS
■	INMG SISMO + INCLINO
●	INMG SISMO
▲	C4G GNSS
▲	C4G GNSS +SISMO
■	C4G SISMO




# Tasks:

## T7.2. Study of the post-eruptive period based on GNSS data.

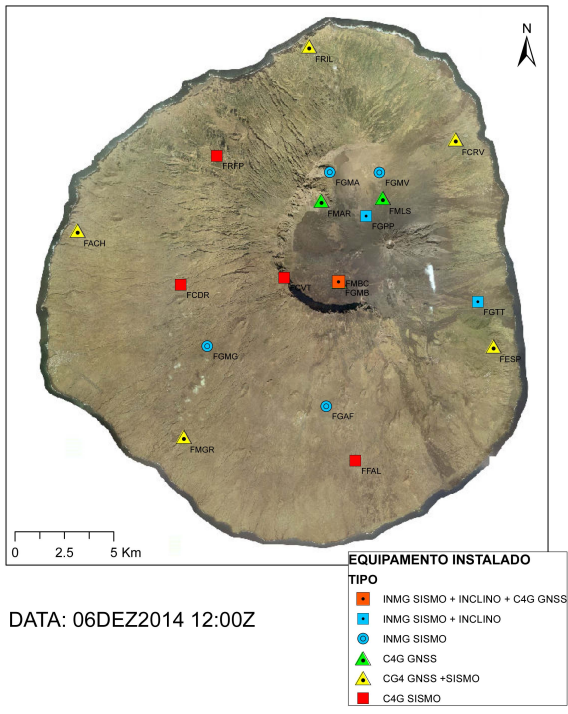
3 Campaigns of Re-observation of the network are planned (together with Task 4

Comparison with previous observations in 1999-2000

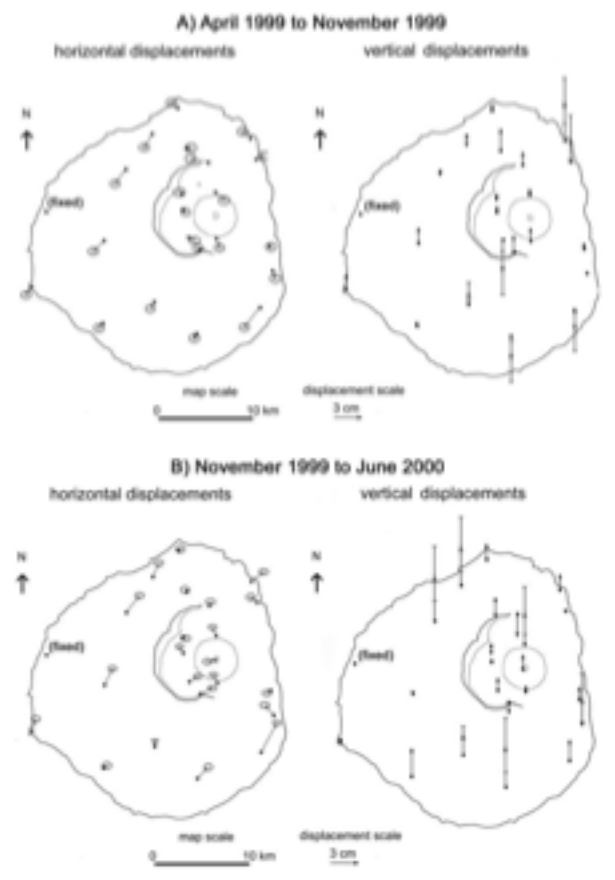


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**INMG C4G**



*J.F.R.D. Fonseca et al. Journal of Volcanology and Geothermal Research 125 (2003) 39-55*



## Tasks:

T7.3. Study of the eruptive period based in joint GNSS and InSAR analysis.

T7.4. Study of the post-eruptive period based in joint GNSS and InSAR analysis.

## Images:

TerraSAR-X (proposal to be submitted to DLR)

Cosmosky (proposal to be submitted to ASI)

Sentinel-1A (ESA)

## Software:

Different Persistent Scatterers Interferometry (PSI) techniques- SARPROZ  
(Danielle Perissin)

## Approaches:

1. Estimate atmospheric parameters using conventional PSI techniques;
2. Estimate atmospheric parameters using GNSS data
3. Integration of the atmospheric GNSS estimates with global atmospheric models.