

Task 4 - Computation of a density model using gravity

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Aqualva (FAGU)

Tasks

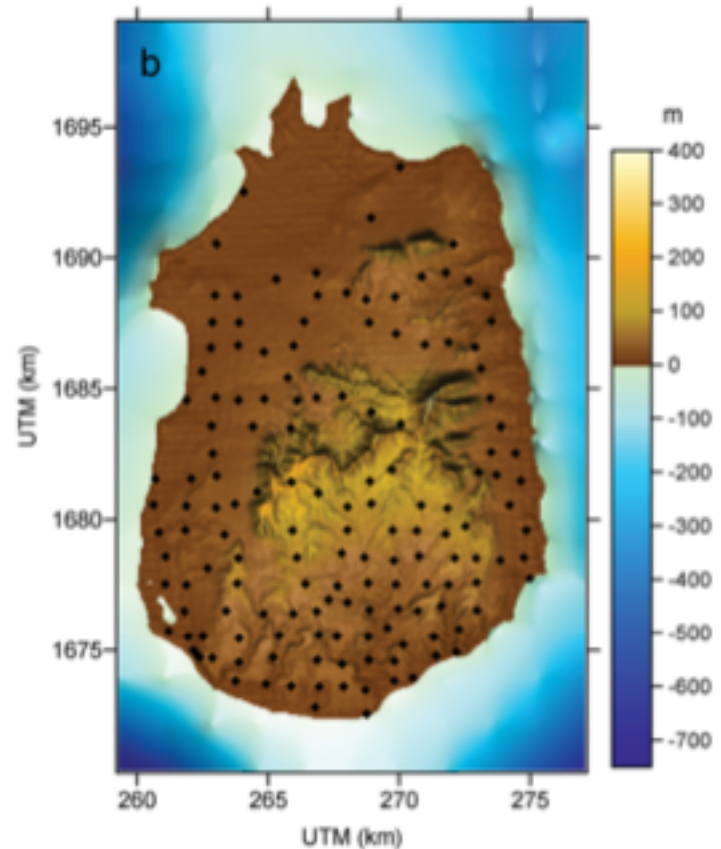
- T4.1 Preprocessing of gravity data
- T4.2 Computation of a density contrast model

Deliverables

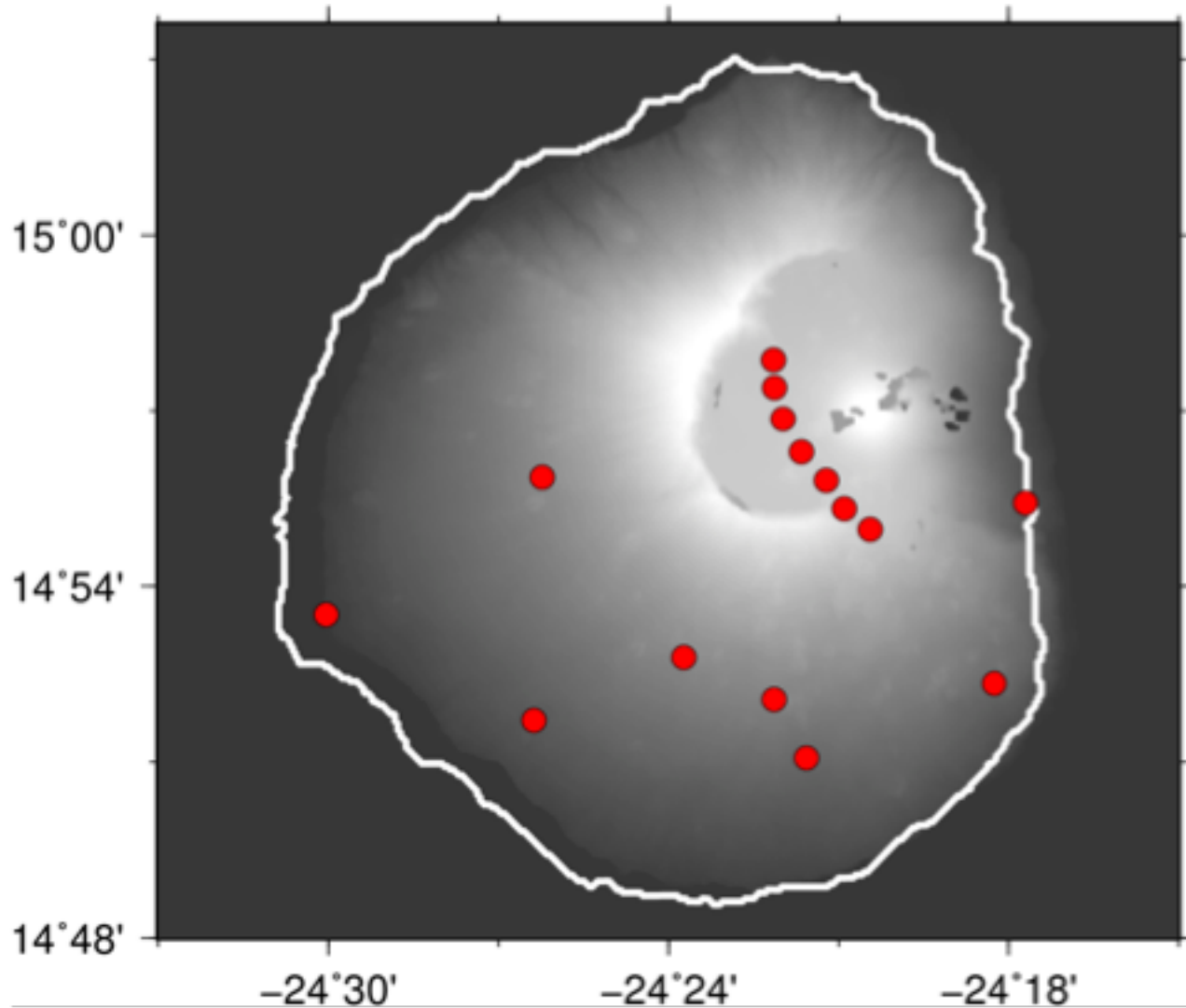
- D4.1 Homogeneous gravity data set for Fogo Island, including marine data (M24)
- D4.2 3D contrast density model (M30)

Represas et al. (2012) made a density contrast model for island of Maio, Cape Verde

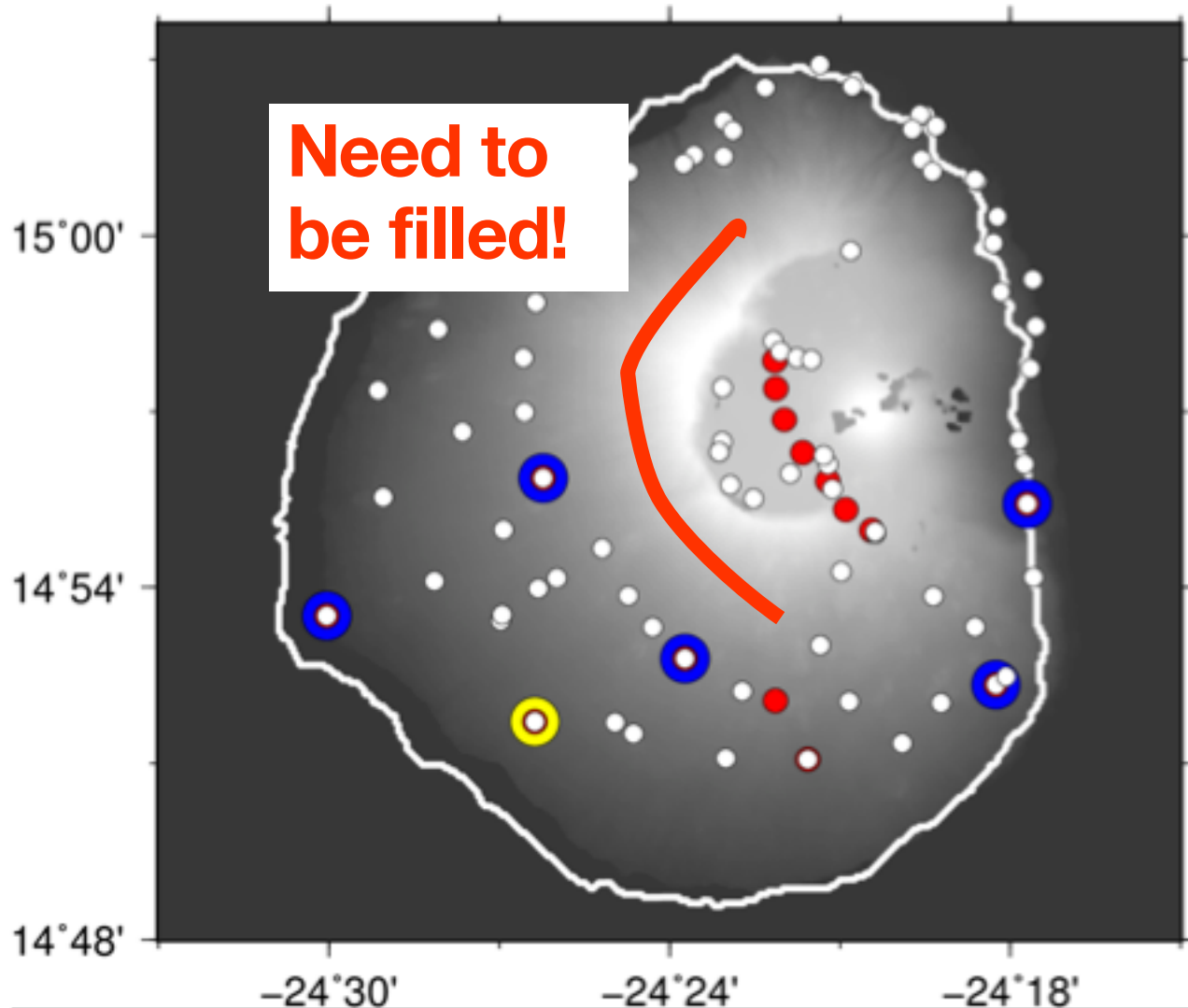
We need to obtain also a 5x5 km grid of gravity observations on Fogo but of course there is a volcano which complicates surveying a regular grid.



Observed in 1999 & 2000 (Fonseca et al., 2003)



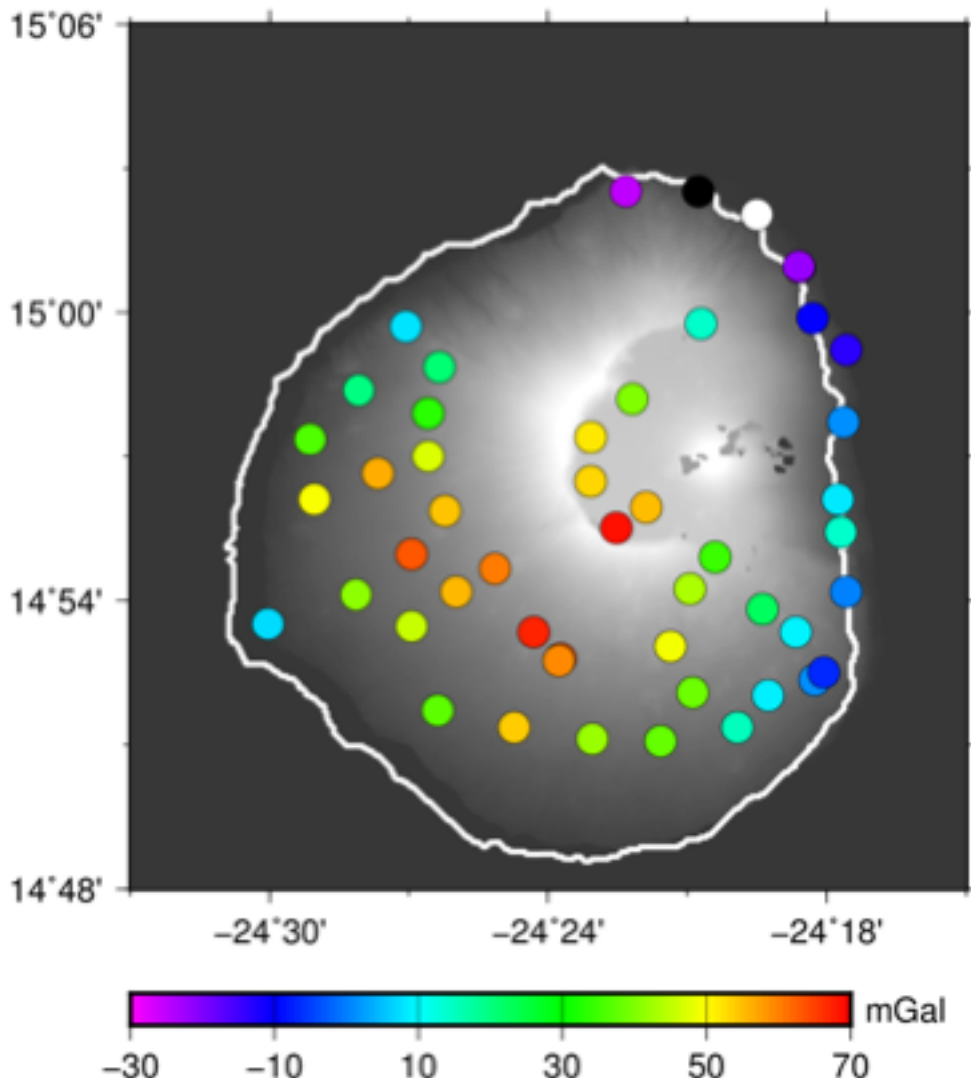
Observed in December 2014/ January 2015



Curiosity exercise: Comparison of gravity value at reobserved points (unit mGal, reference Genebra (FGNB))

Point	May 1999	November 1999	June 2000	December 2014
Tinteira (FTTR)	-32.490	-32.261	-32.294	-32.250
Fig. Pavão (FFPV)	-65.598	-65.444	-65.444	-65.522
Cemitério (FSFP)	34.562	34.565	34.569	37.801
Agualva (FAGU)	-102.815	-102.799	-102.818	-102.990
Cidreira (VU18)	-130.321	-130.214	-130.282	-131.096

First plot of residual gravity field



Subtracted:

EGM2008 (global
gravity model)

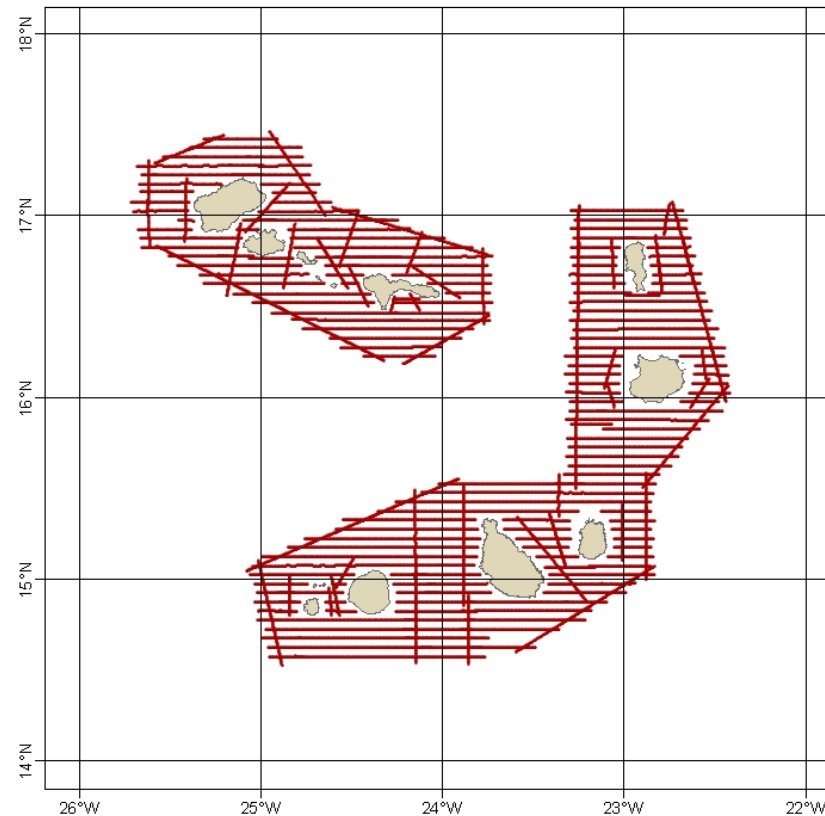
+

effect short
wavelength
topography (using
Aster DTM,
wavelengths smaller
than 20 km)

Available marine gravity data

Cape Verde Archipelago

STARELLA



Data displayed on this plot is for Use Only By:
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Data cannot be released to any third party.

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Michael A. Prugger
National Geospatial-Intelligence Agency
Michael.A.Prugger@nga.mil

Special Release Data

20,386 stations

What's next?

- Gravity measurements were made along all roads at Fogo.
- What's missing is a profile along the side of the volcano. Requires special planning (On foot, with mule to carry gravimeter!? Spending a night outside in tent?)
- To compute density contrast model we need from other work packages:
 - 1) Good DTM
 - 2) First guess of depth of various layers underneath the surface

Finally:

- Absolute gravity measurements on Fogo would be great. Make a link with old absolute gravity point on Sal island at the airport? (Meteorological station).

Conclusions

- The gravity work package has a clear objective, the experience to perform the inversion and already some preliminary gravity data.
- Some more data around the volcano is needed to ensure spatial resolution of gravity observations on the surface is enough to resolve mass variations underneath the surface.

Thank you!

Any questions:

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