Singular Reflections on the Golfo della Botte

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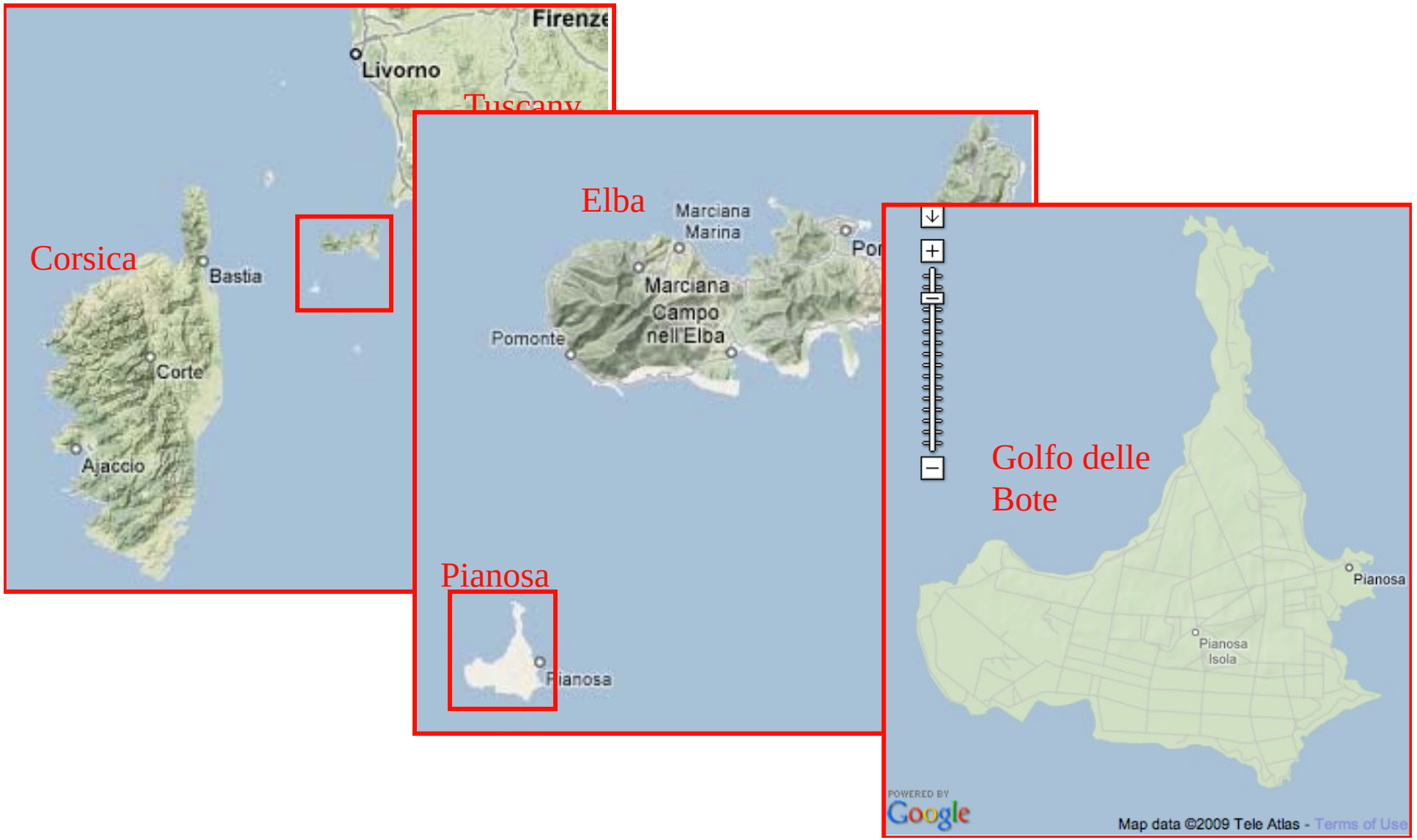
Where?


Firenze
Livorno
Tuscany
Corsica
Bastia
Corte
Ajaccio
Elba
Marciana
Marina
Marciana
Campo
nell'Elba
Pomonte
Pianosa
Pianosa
Golfo delle
Bote
Pianosa
Pianosa
Isola
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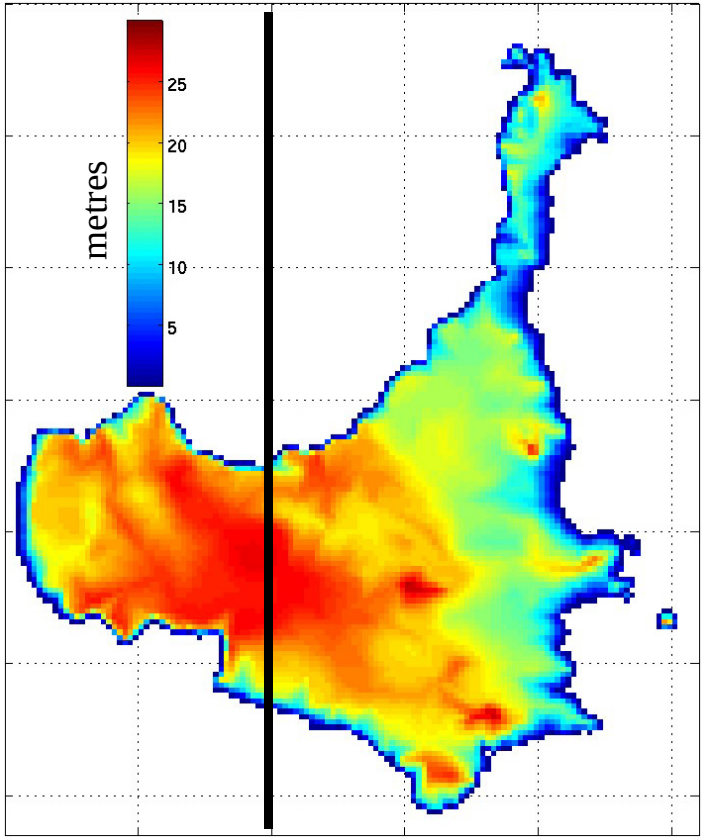
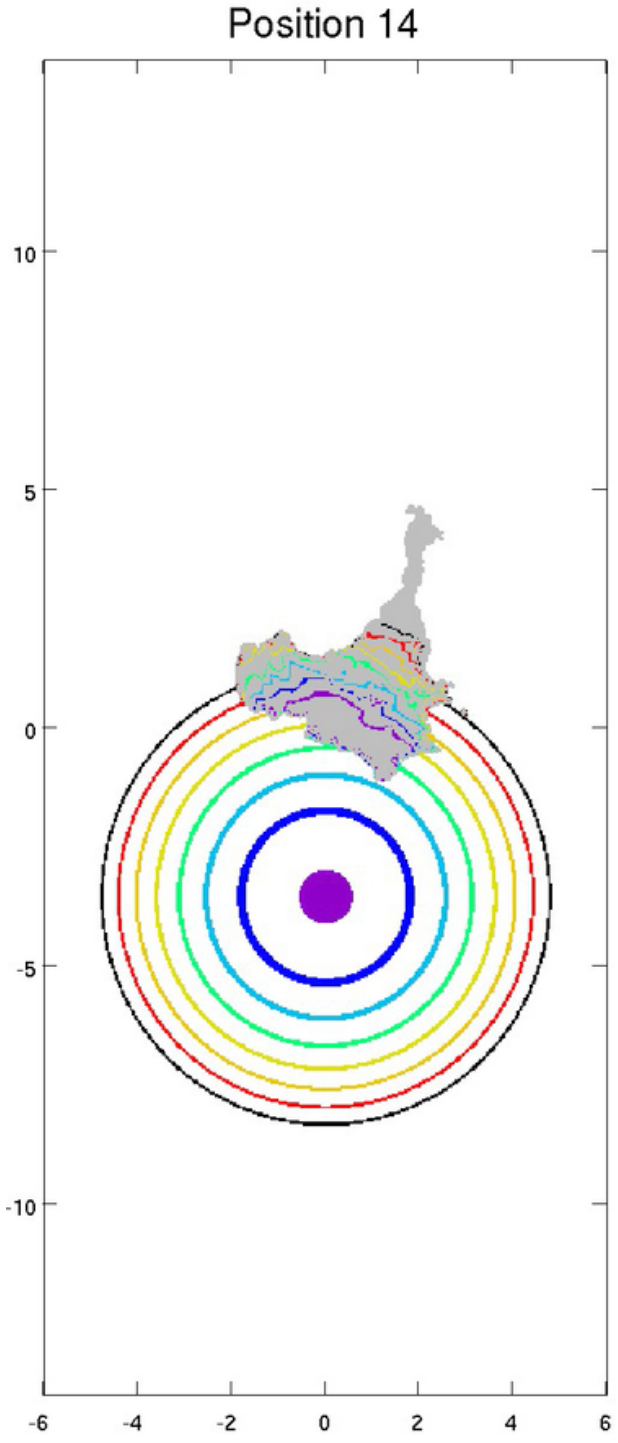
Why?
Pianosa
Small island (~10 km2)
Known DEM
Flat (peak ht=28m)
Met. station

Envisat fly by



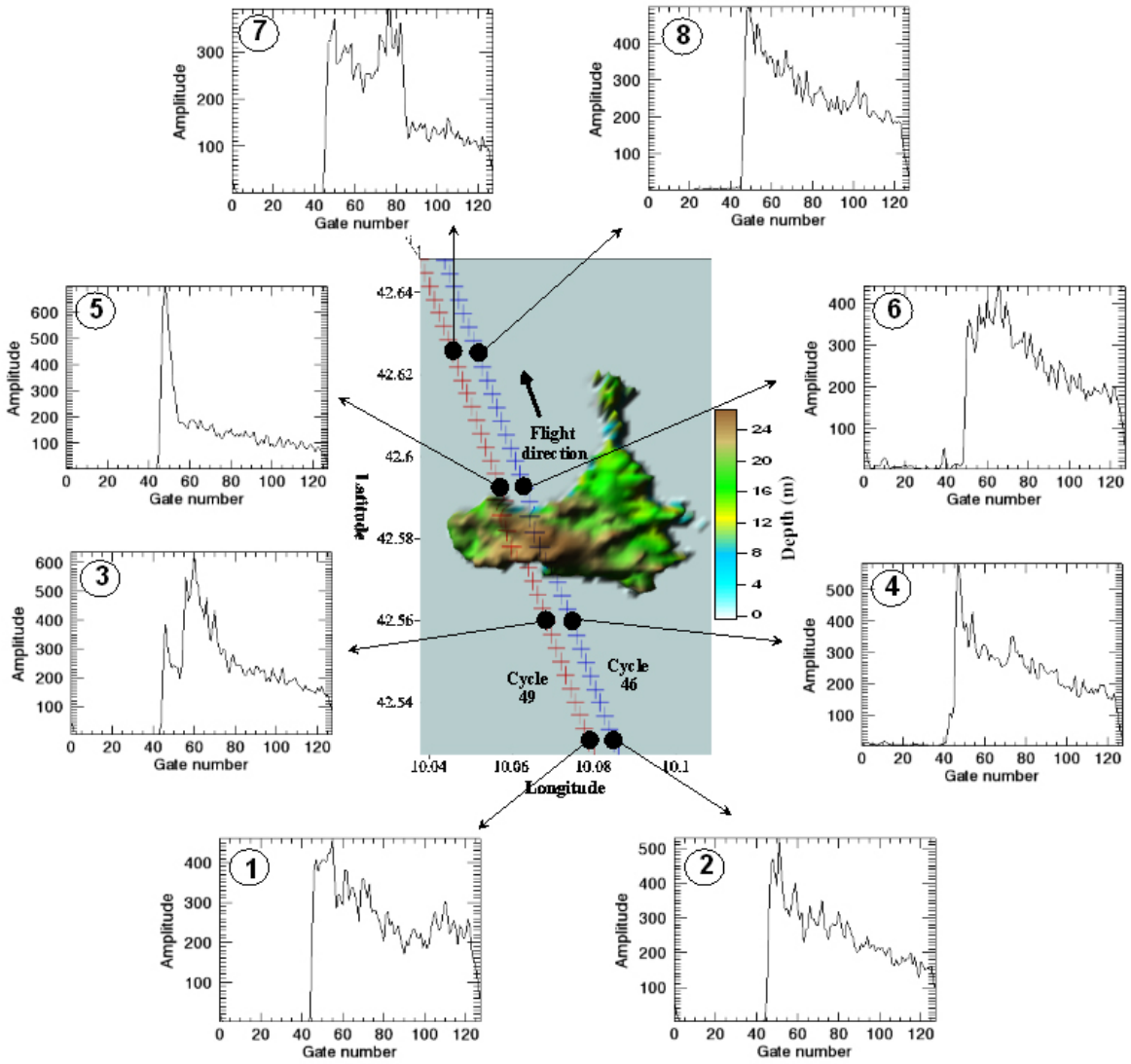


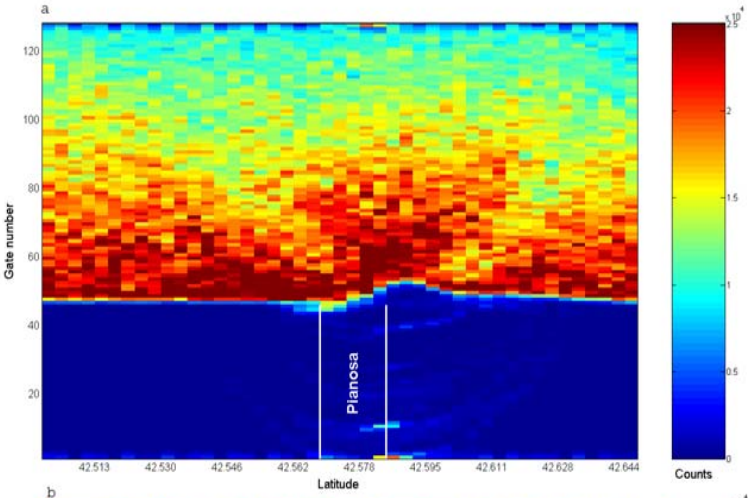
Expected effects on altimetry:

Weaker over land -> power loss for where no sea

Land higher -> Return before track point

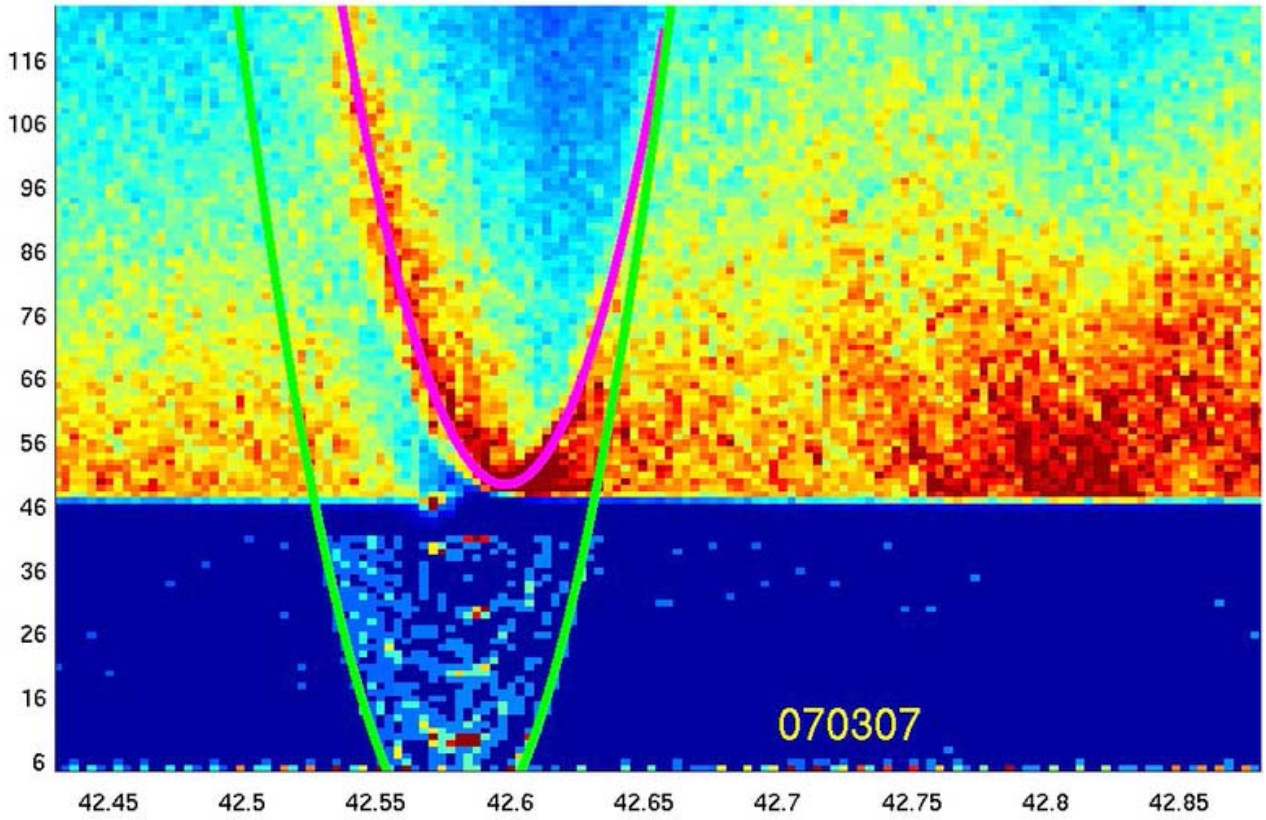
Waveform analysis





20 passes

11 hyperbolae



Physical cause?

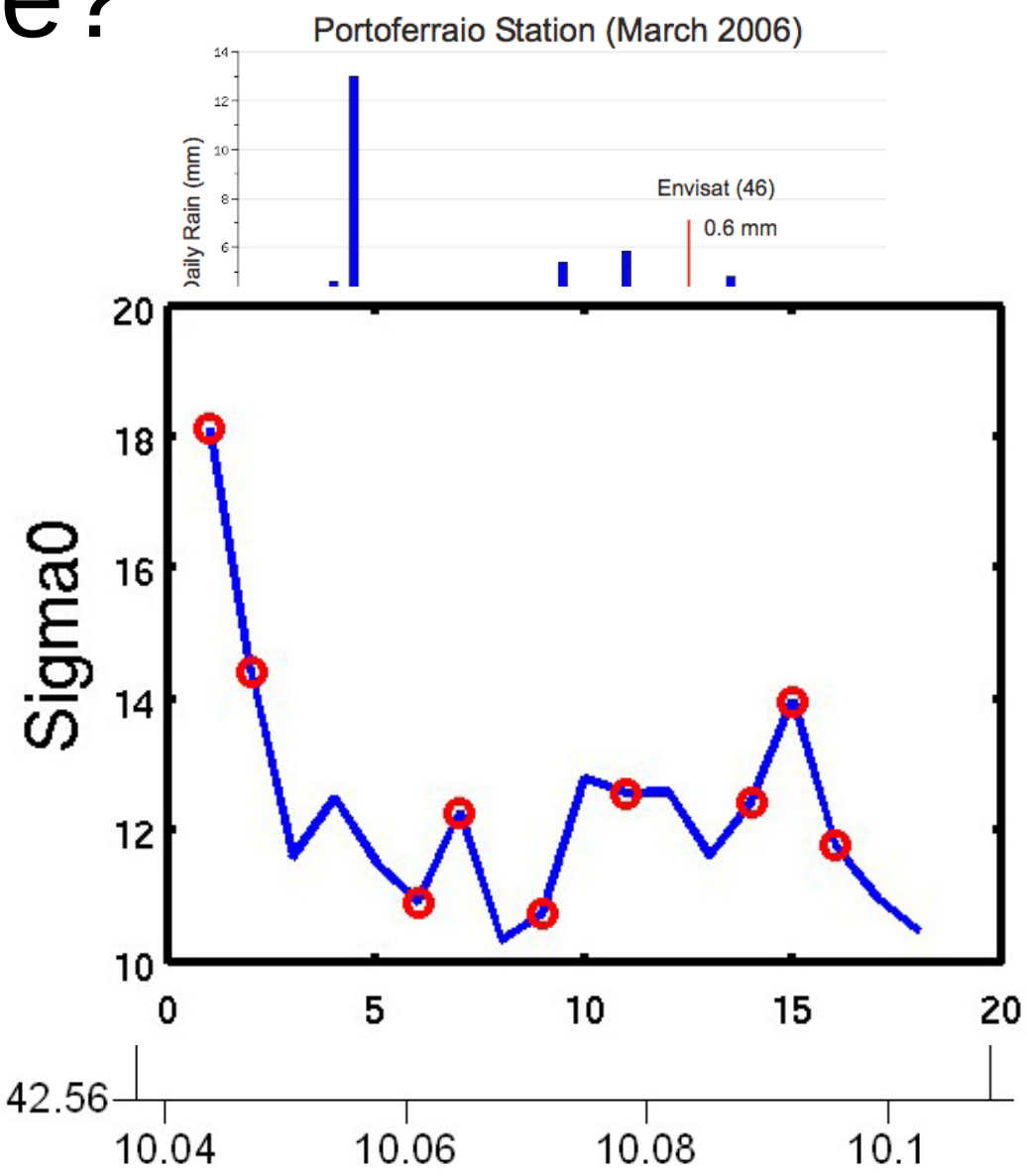
Recent rainfall? ***No***

Land target? ***No***

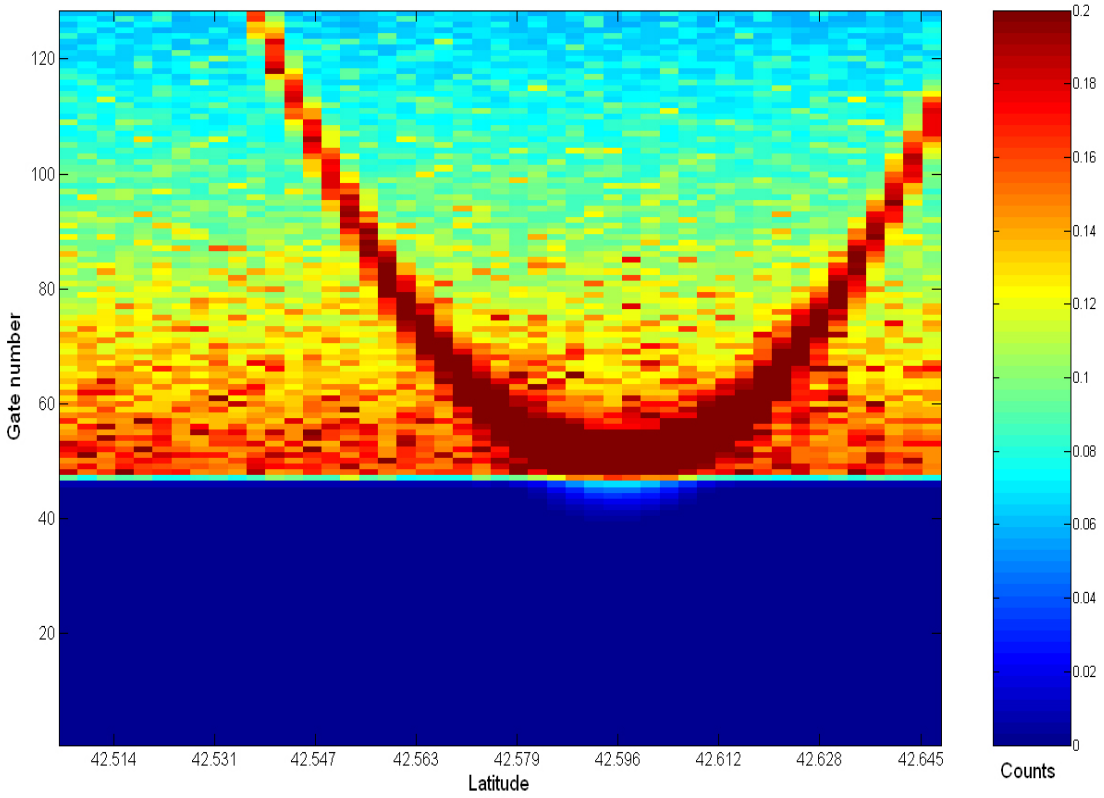
Exposed sand banks? ***No***

Wind speed? ***No***

Wind direction, waves, cu



Simulated signal



Bright target is physically small

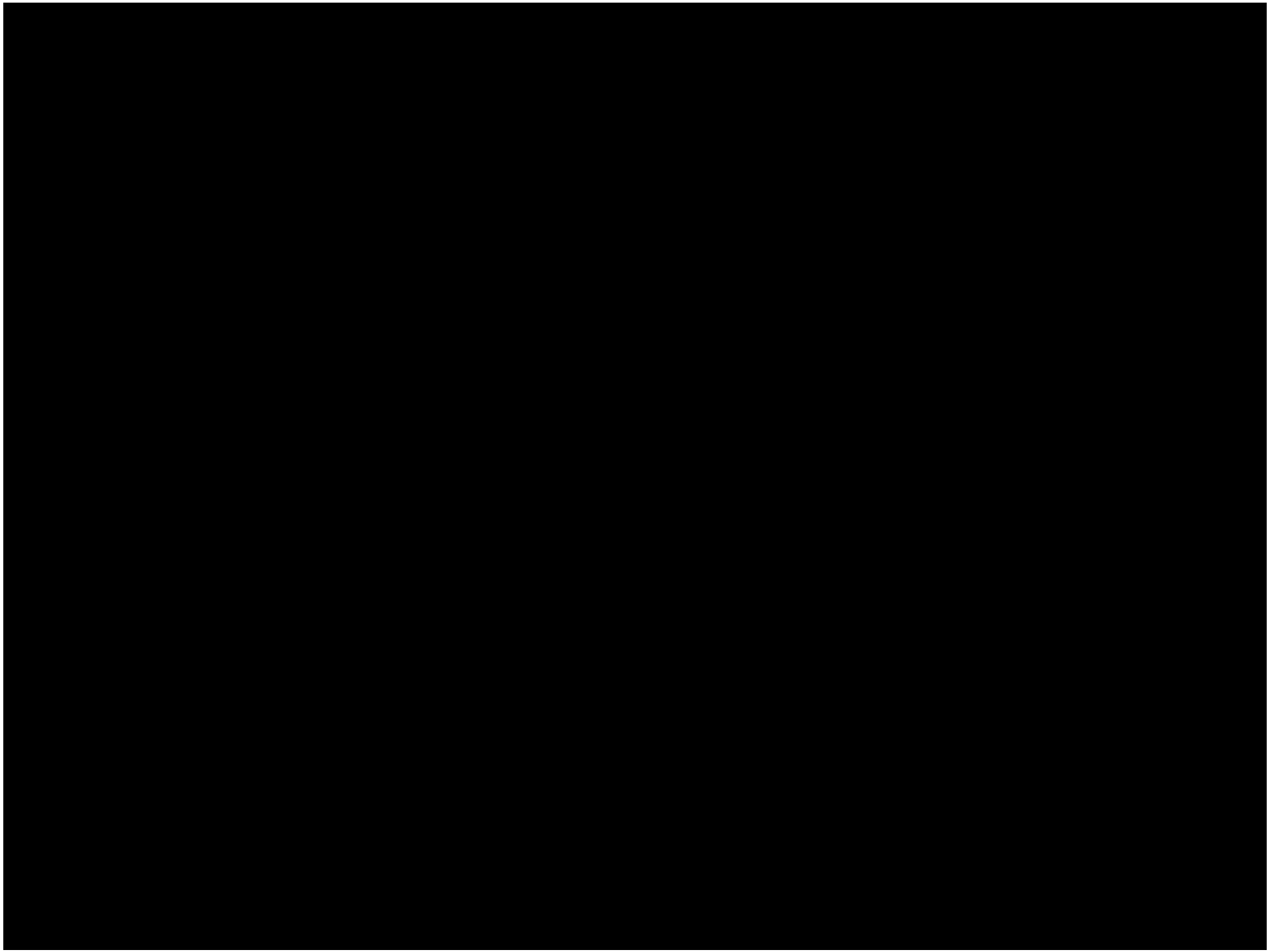
Ongoing work

Understand physical causes

Simulate and remove effects

Achieve altimetry up to coast

Simple, but common, example



Pianosa: land surface

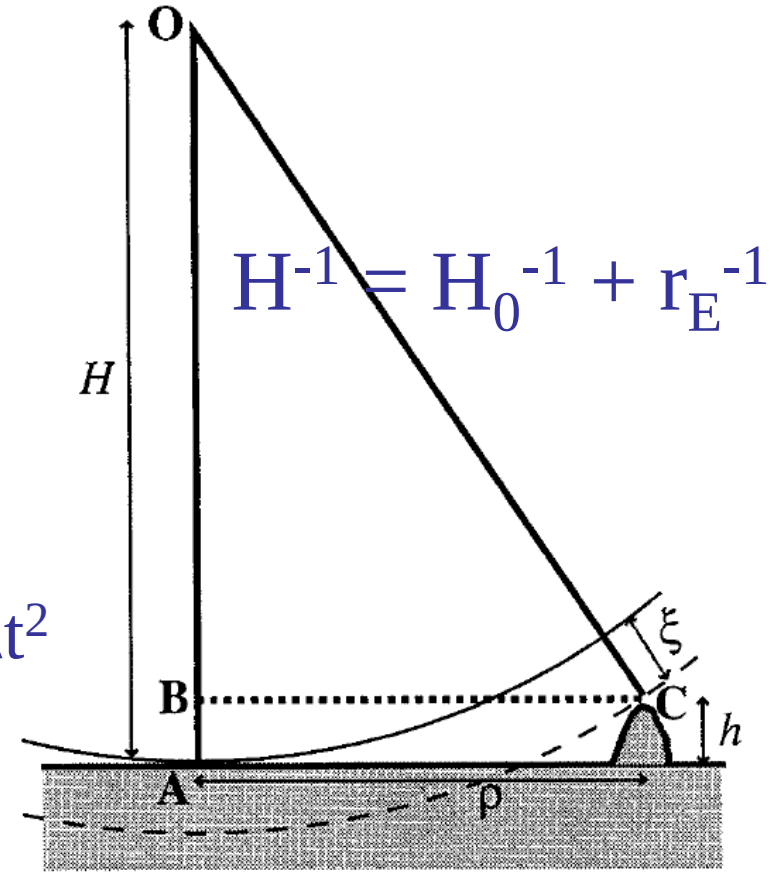
Images from http://piccard.esil.univmed.fr/venus/

"Quadratic"

$$(H - h)^2 + \rho^2 = (H + \xi)^2$$

$$H^{-1} = H_0^{-1} + r_E^{-1}$$

$$\xi = (b - b_0)\, g \quad ; \quad \rho^2 = \rho_0^2 + v^2 \Delta t^2$$



b - Bin number, g - bin width

ρ_0 - nearest range

v - velocity, Δt - waveform interval

$$(2Hh + h^2 - \rho_0^2) + 2Hg\,(b - b_0) = v^2 \Delta t^2$$