Singular Reflections on the Golfo della Botte

Graham Quartly,
Jesus Gomez-Énri, Stefano Vignudelli,
Paolo Cipollini, Peter Challenor,
Christine Gommenginger & Jerome Benveniste
Where?

Corsica
Tuscany, ITALY
Elba
Pianosa
Golfo delle Bote
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, etc.
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"

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

\[\xi = (b-b_0) \cdot g \quad ; \quad \rho^2 = \rho_0^2 + v^2 \cdot \Delta t^2\]

- \(b\) - Bin number, \(g\) - bin width
- \(\rho_0\) - nearest range
- \(v\) - velocity, \(\Delta t\) - waveform interval

\[
(2Hh + h^2 - \rho_0^2) + 2Hg (b-b_0) = v^2 \cdot \Delta t^2
\]