

# Firsts results on the modelling of the Gran Canaria atmospheric wake



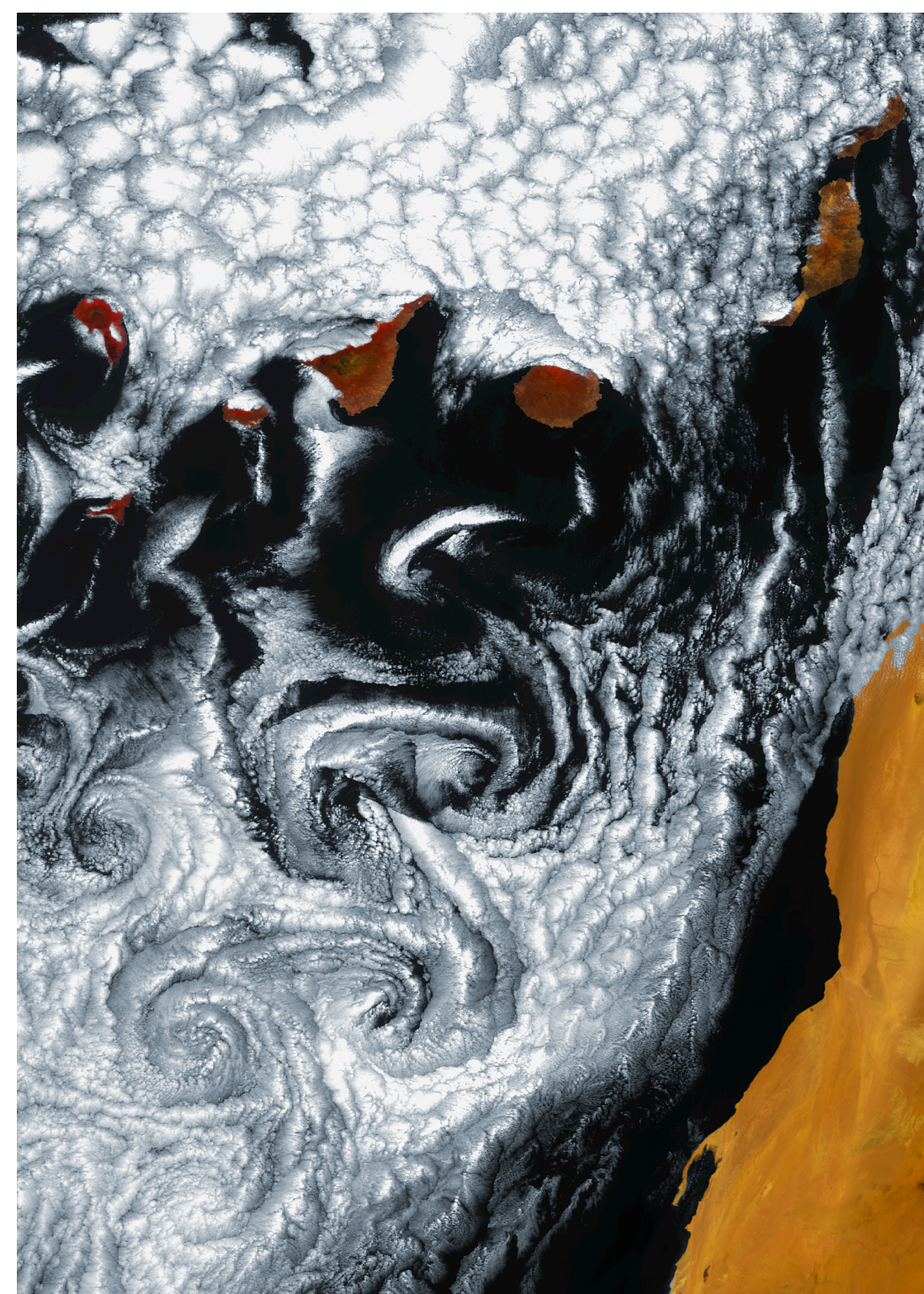
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This poster shows the first attempt to modelize the Gran Canaria Island wake, an obstacle with almost a conical shape (60 km diameter and about 2000 m height). The leeside circulation was modeled for two well-defined street vortex cases during June 2010 and March 2011. Numerical simulations of these events were carried out using the 3.1.1 version of the Weather Research and Forecasting (WRF-ARW) Model. Three different domains with 4.5-km, 1.5-km and 0.5-km horizontal grid spacing and 70 vertical sigma levels were defined. The simulations were performed using two-way interactive nesting between the first and the second and third domains, using different land surface model parameterizations (Thermal diffusion, Noah LSM and RUC) for comparison. Initial conditions were provided by the NCAR Dataset analysis from April 2007. The poster is focused on both episodes using NoahLSM parameterizations.

## Von Karman vortex on 06/06/2010



This false-colour (infra-red) image was acquired by Envisat's Medium Resolution Imaging Spectrometer on 6 June 2010 at a resolution of 300 m, 12:00 GMT



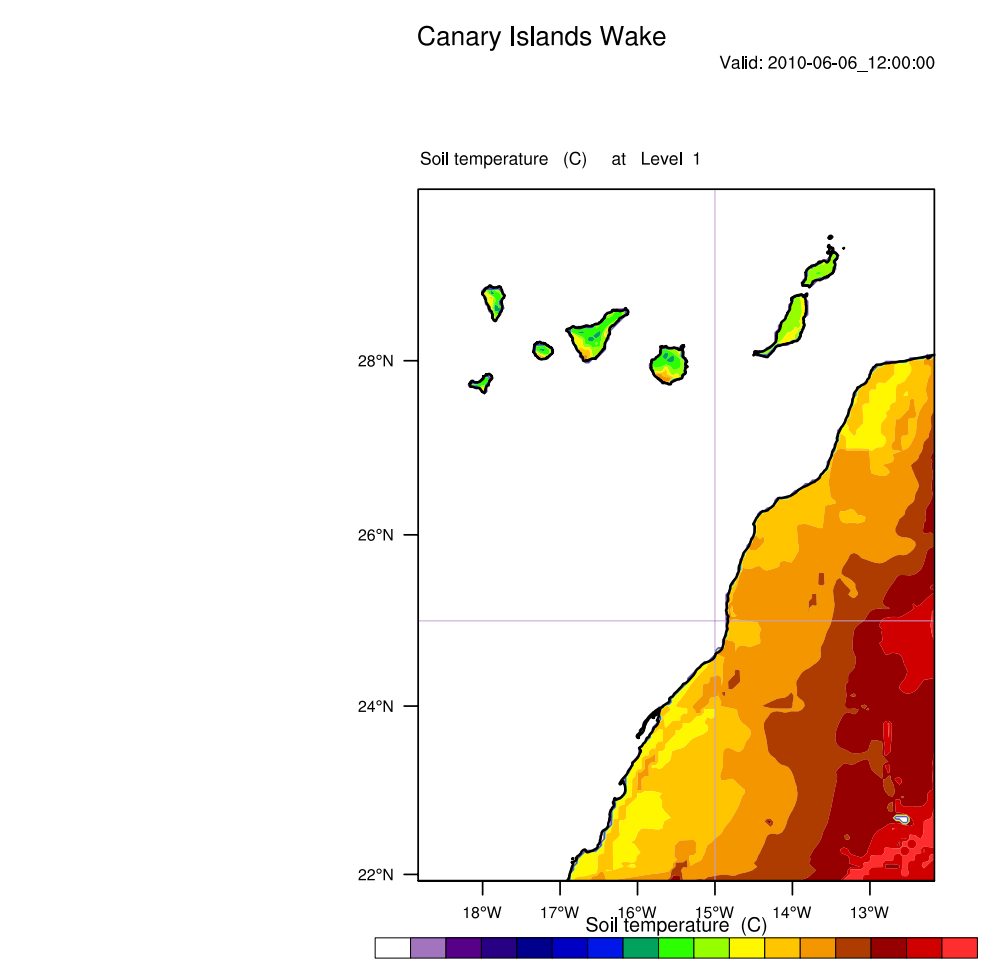
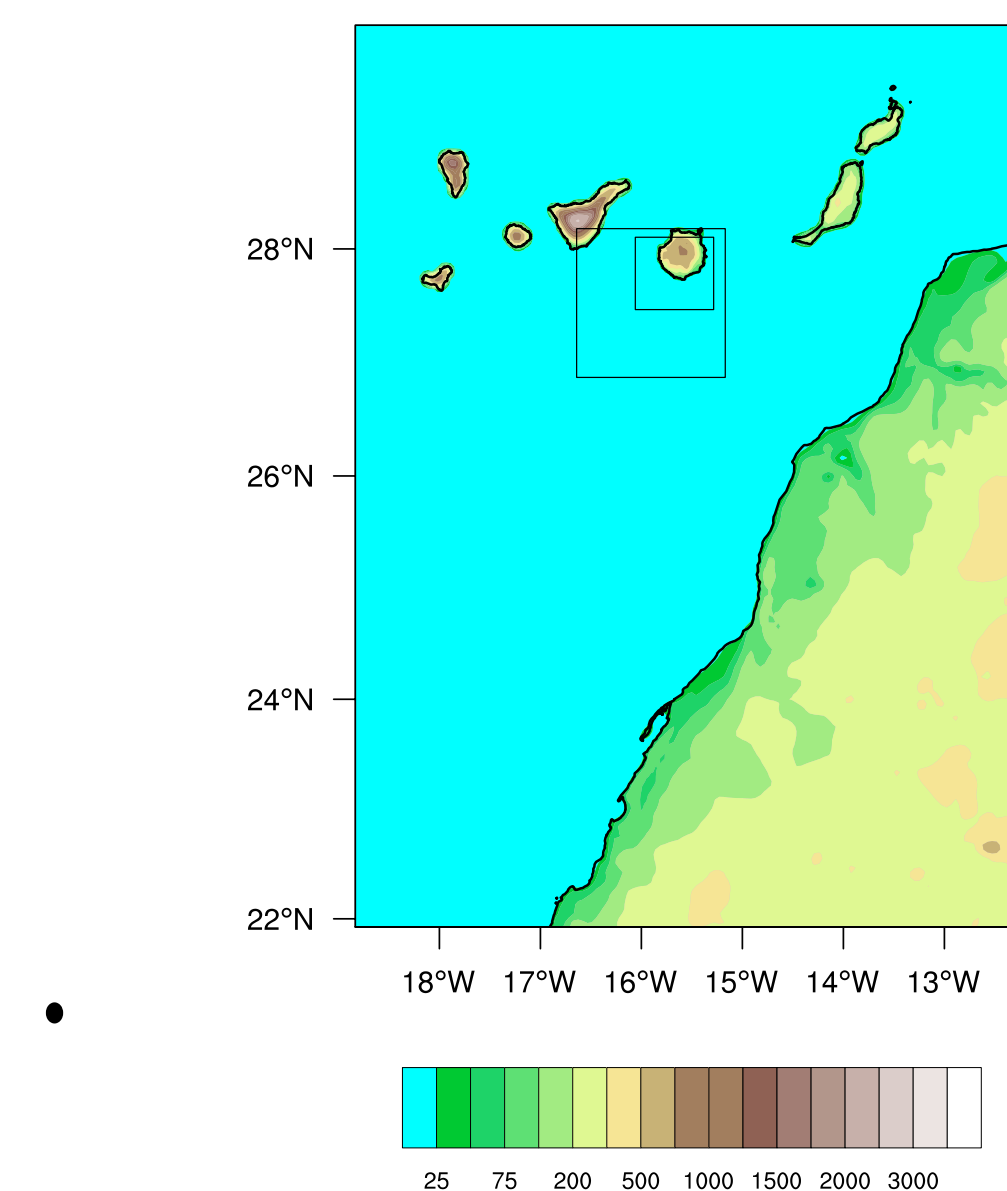
06/06/2010, 12:00 GMT



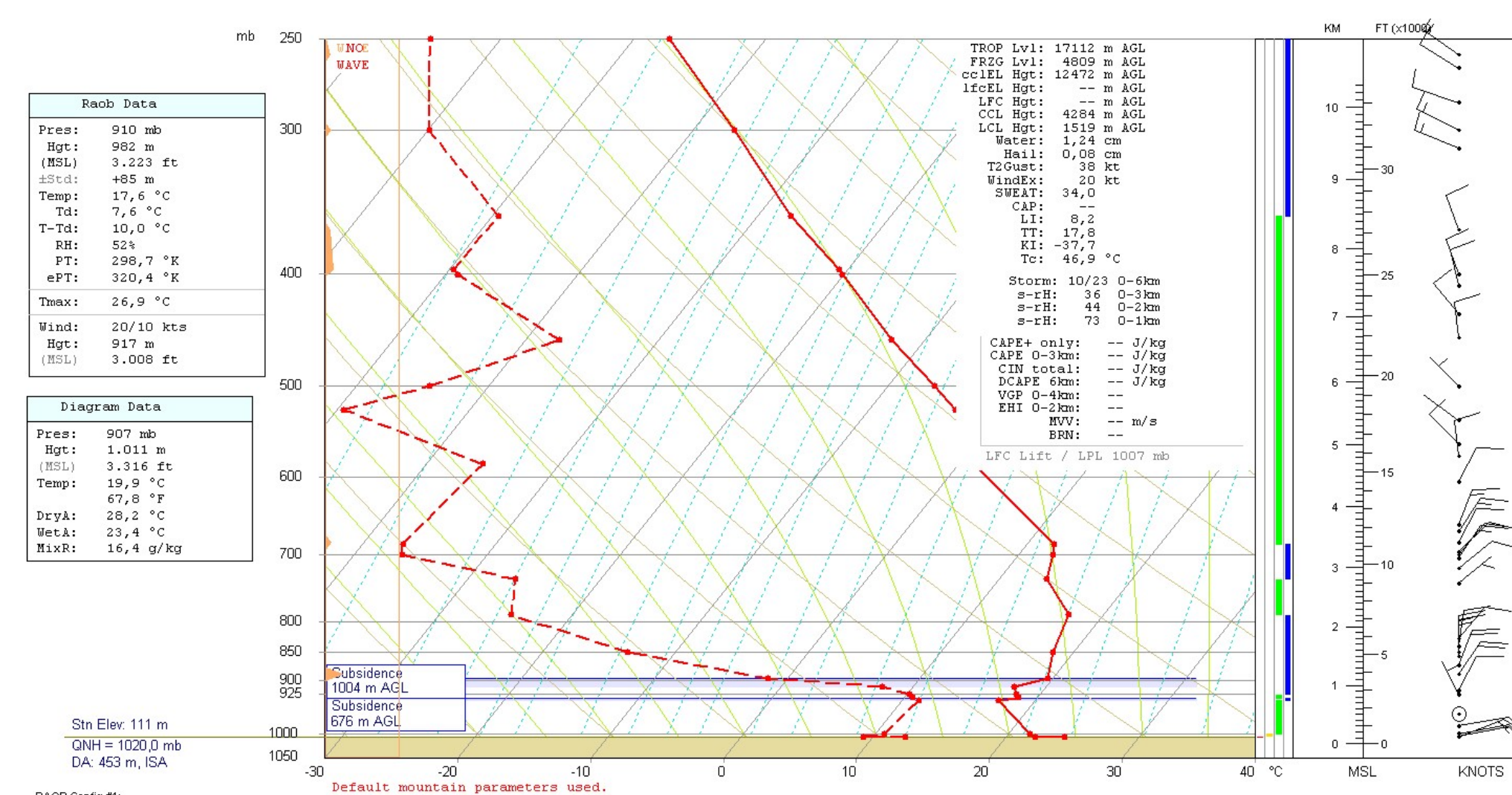
02/03/2011, 18:00 GMT

RGB Composite MSG images using Channels 1,2,3

## WRFV3.1.1 Configuration (ARW)



• SkewT-logP plot of the closest sounding for 06/06/2010 at Tenerife Island. The rawinsonde station is placed leeward.



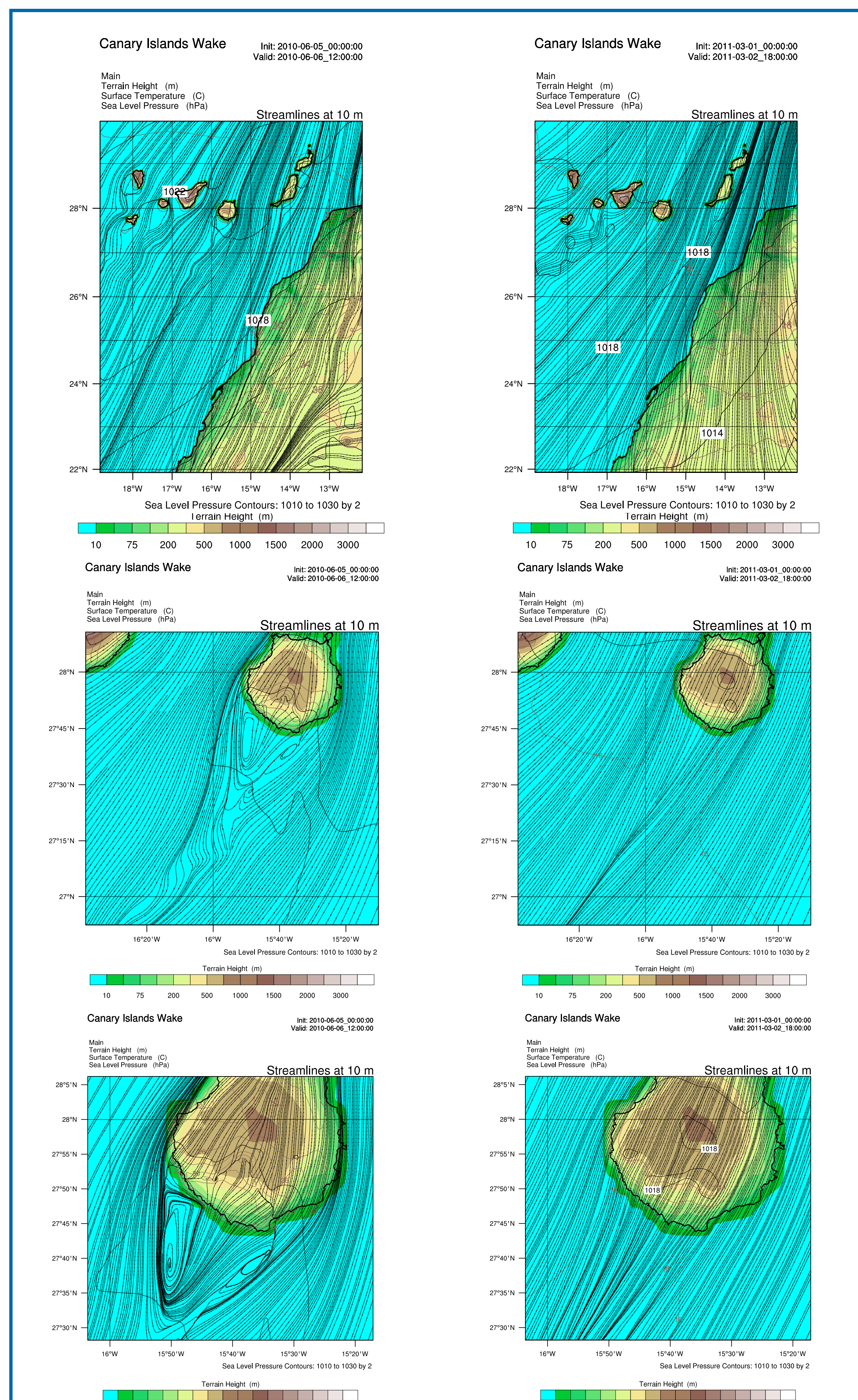
Example of a typical profile of the days with Von Karman street vortex:  $N = 0.01 \text{ s}^{-1}$   $Fr = 0.25$   $h = 1500 \text{ m}$

- 3 nested domains (4.5, 1.5, 0.5 km), two-way nested feedback
- Input data: FNL dataset ds083.2 with  $1^\circ \times 1^\circ$
- Improved using surface and upper-air observations (ds353.4 and ds464.0)
- Microphysics scheme : Lin et al. (opt. n° 2)
- Cumulus scheme : Kain-Frisch (new Eta scheme)
- Planetary boundary layer (PBL): Monin-Obukhov
- Atmospheric Radiation scheme: RRTM (LW) & Dudhia (SW)

- The land use of the islands is reduced to a few categories:
  - Barren or sparsely vegetated(19), water bodies (16), savanna(13) and urban and built-up lands (2)

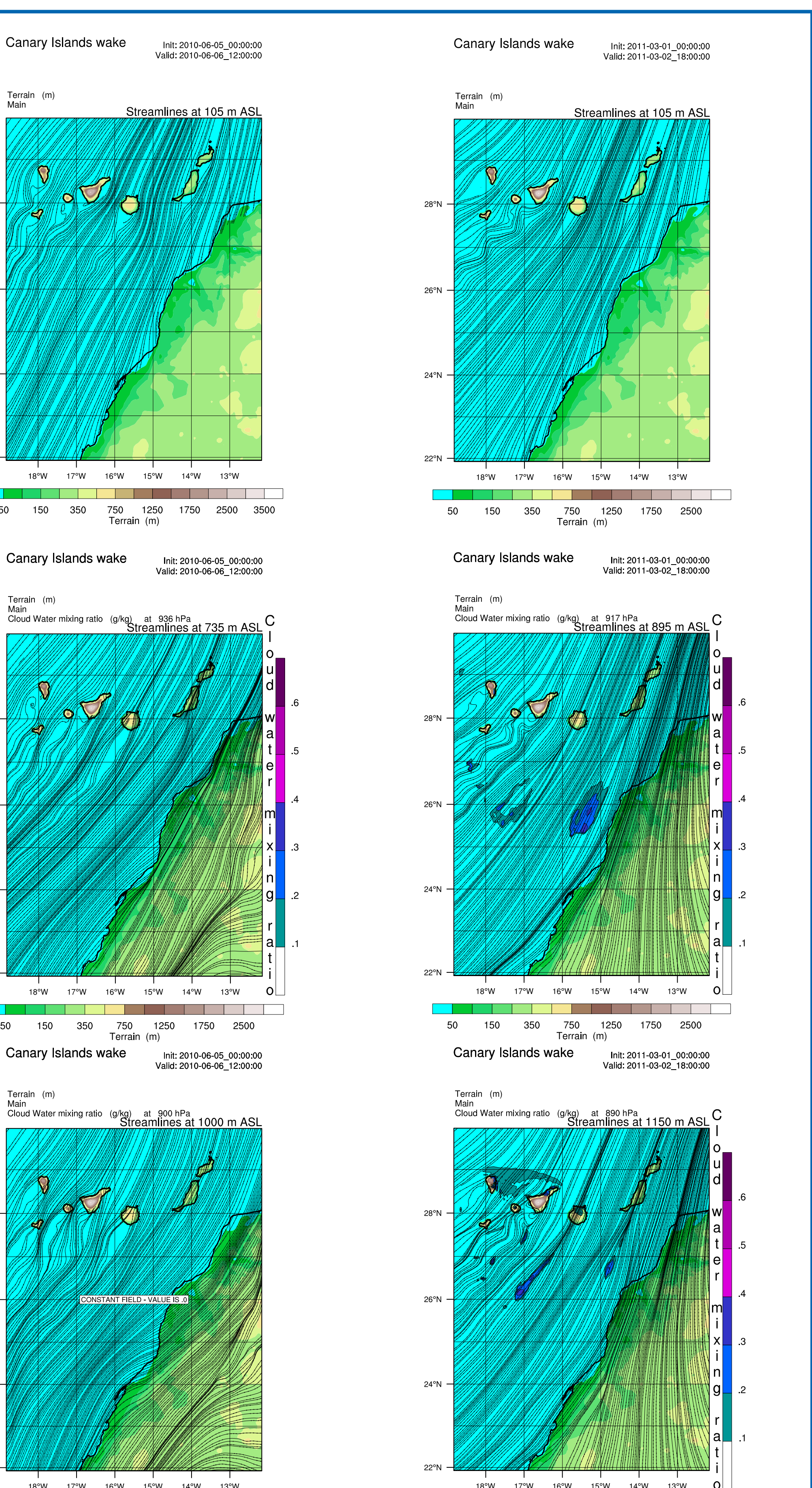
- Example of the typical initial conditions during the simulations (on the left)

## Plots (1): SLP, Surface Temp and streamlines at 10 m



Best results: NoahLSM with 70 levels; simulations reproduce both the wake and the convergence line lee of Gran Canaria

## Plots (2): streamlines at different layers



The marine stratocumulus layer, capped by the trade wind inversion (shallow convection), is poorly reflected