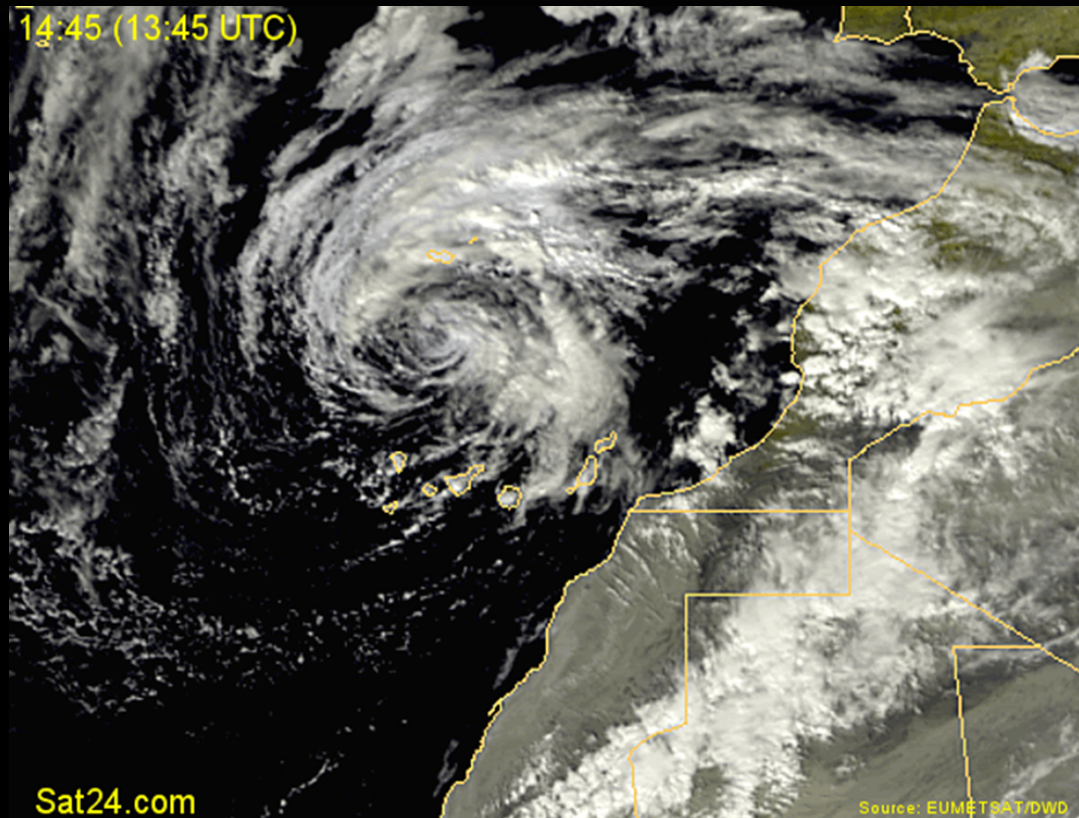


“A CASE STUDY OF HEAVY CONVECTIVE PRECIPITATION EVENT OVER THE CANARY ISLANDS ASSOCIATED WITH A POLAR-SUBTROPICAL CYCLONE” (26TH-JANUARY TO 3RD-FEBRUARY 2010)



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6th European Conferences on Severe Storms 2011, Baleares**

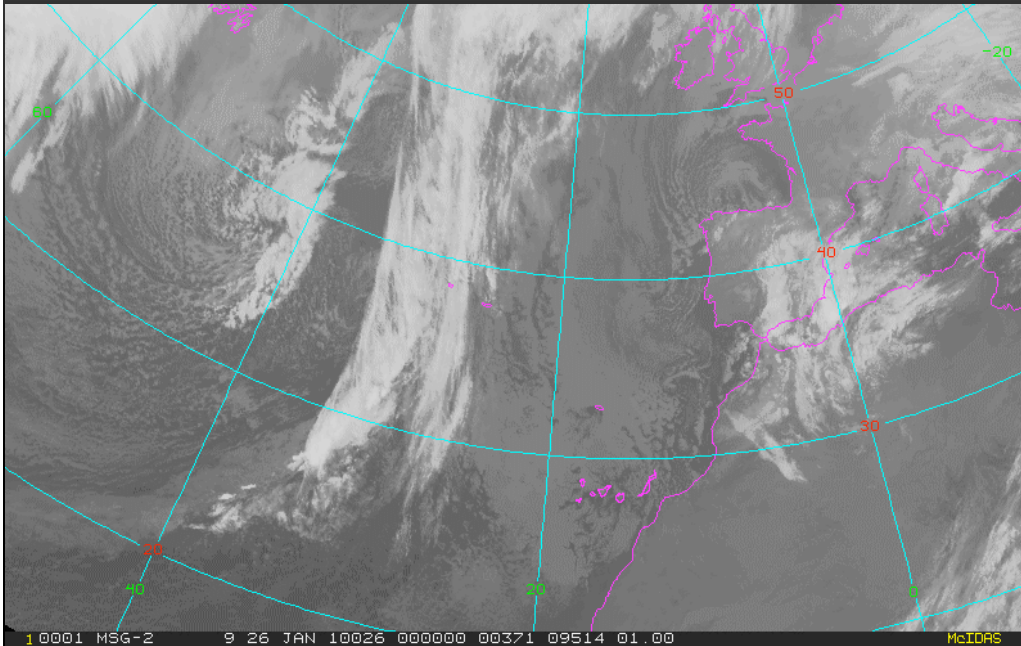
OUTLINE

- **Introduction**
- **Previous framework**
- **Evolution**
- **Extratropical- subtropical features**
- **ECMWF model behavior**
- **Summary**

INTRODUCTION

MAIN GOAL:

To show a complex case of the cyclone development and evolution from extratropical origin (26th January) to subtropical/hybrid ending (3rd February).



MOTIVATION:

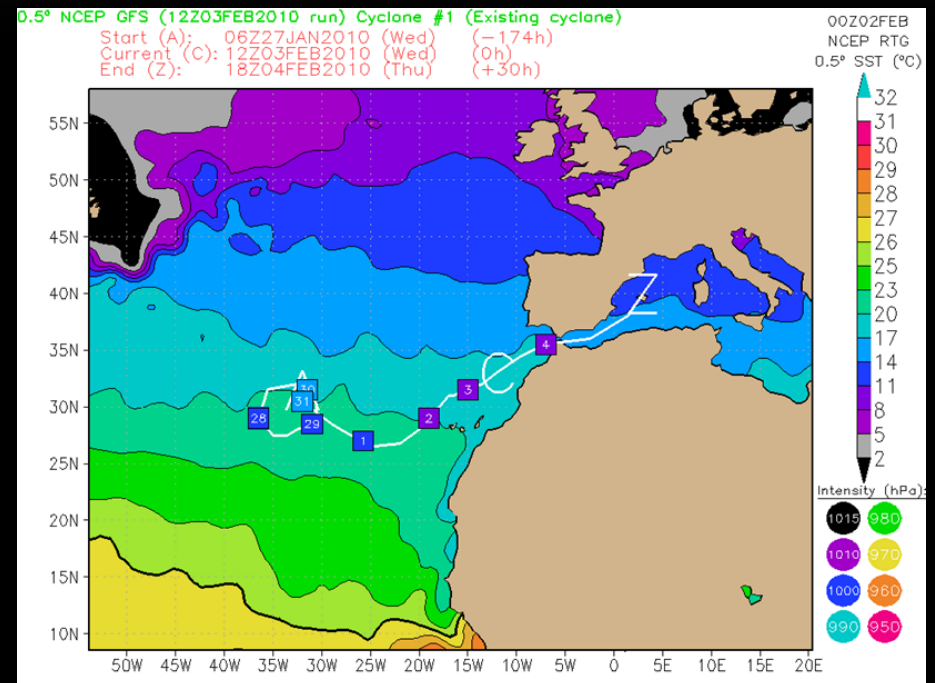
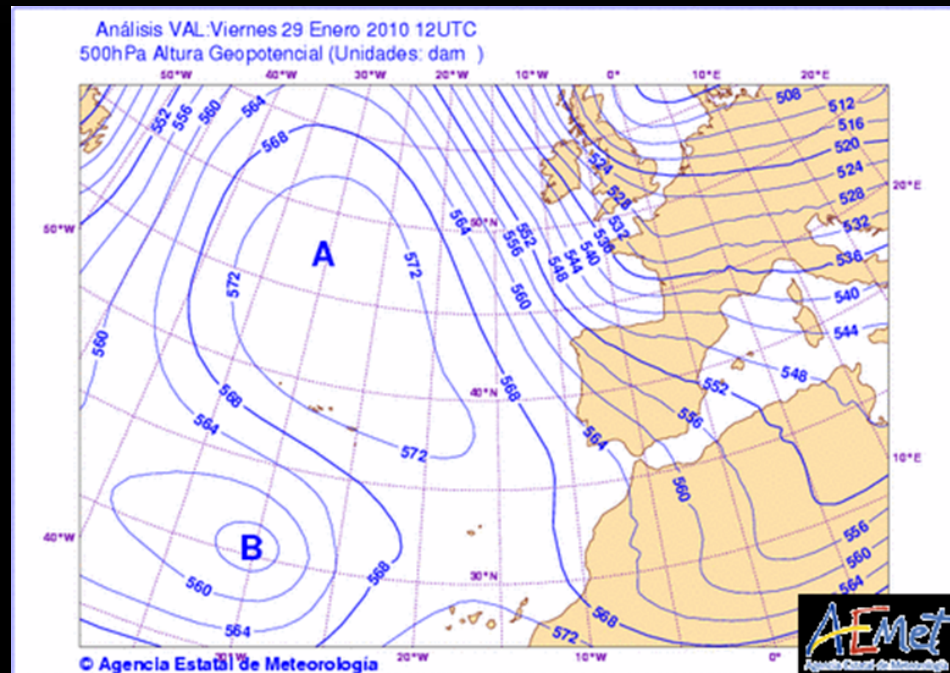
Extreme rainfall intensities and torrential events were observed at the Canary Islands on 1st-2nd February 2010:

- 620 mm rain at Gran Canaria Island
- 138 mm/h of rainfall intensity at Tenerife Island.

PREVIOUS FRAMEWORK: SYNOPTIC CONFIGURATION

- “EL NIÑO”: moderate-high, NAO (North Atlantic Oscillation) and AO (Arctic Oscillation): negative.

High-latitude blocking that permit a intense cyclonic activity at low latitudes

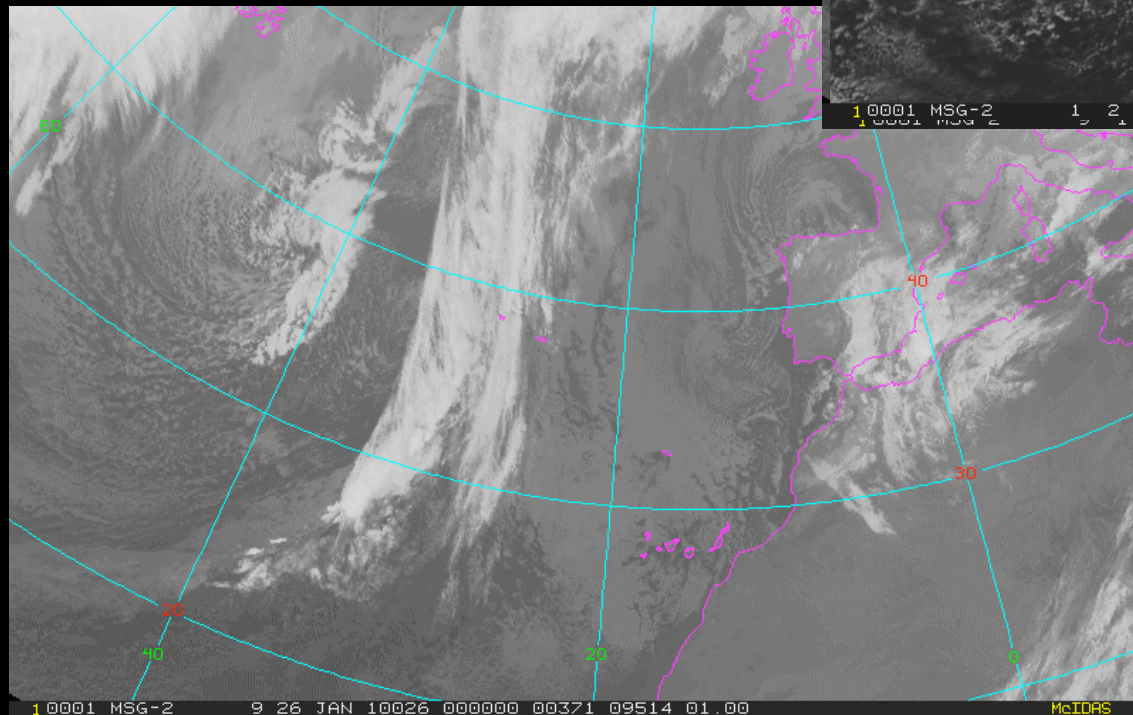
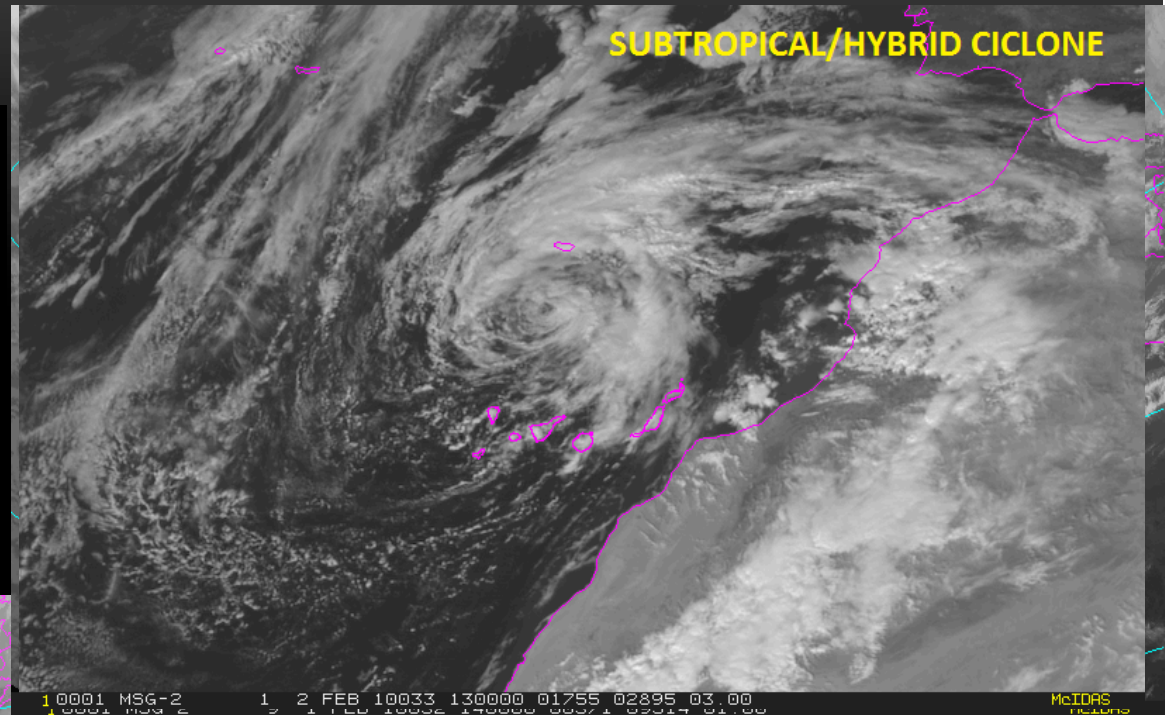


- Anomalous high SST: 1.2°C warmer than usual, between 20 and 23°C, and an anomalous high precipitable water

Environment favorable for convective developments

CYCLONE EVOLUTION: IR 11.8 SATELLITE IMAGES

Surface low deepens
Shallow warm core
Bands and a little eye
Shape recall a tropical cyclone
Baroclinic and diabatic processes
coexist

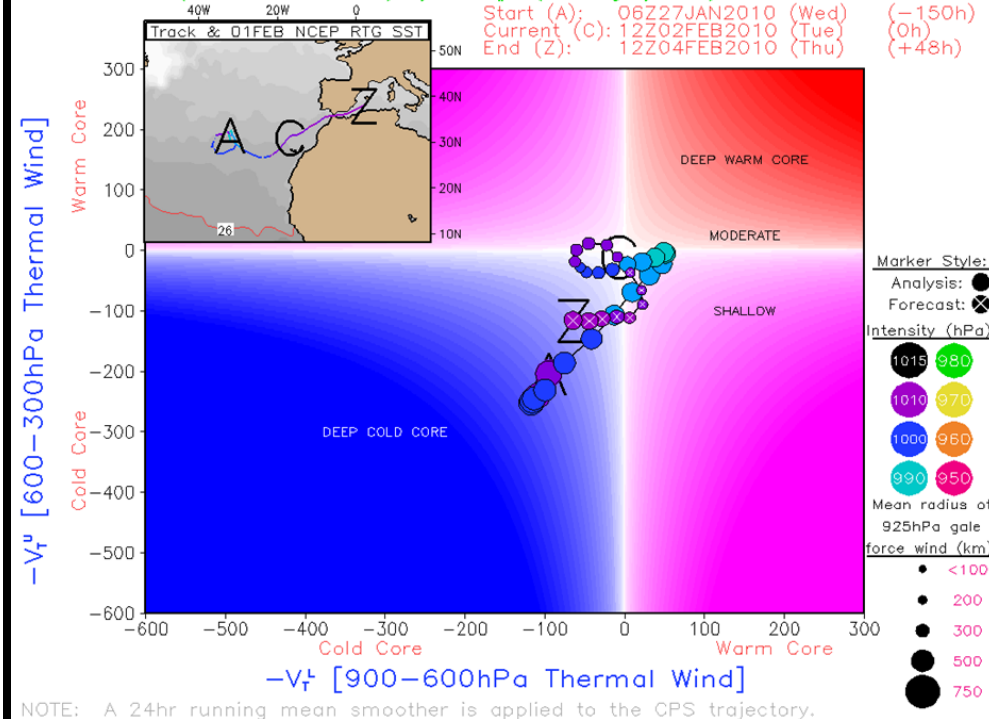


SUBTROPICAL/HYBRID CYCLONE

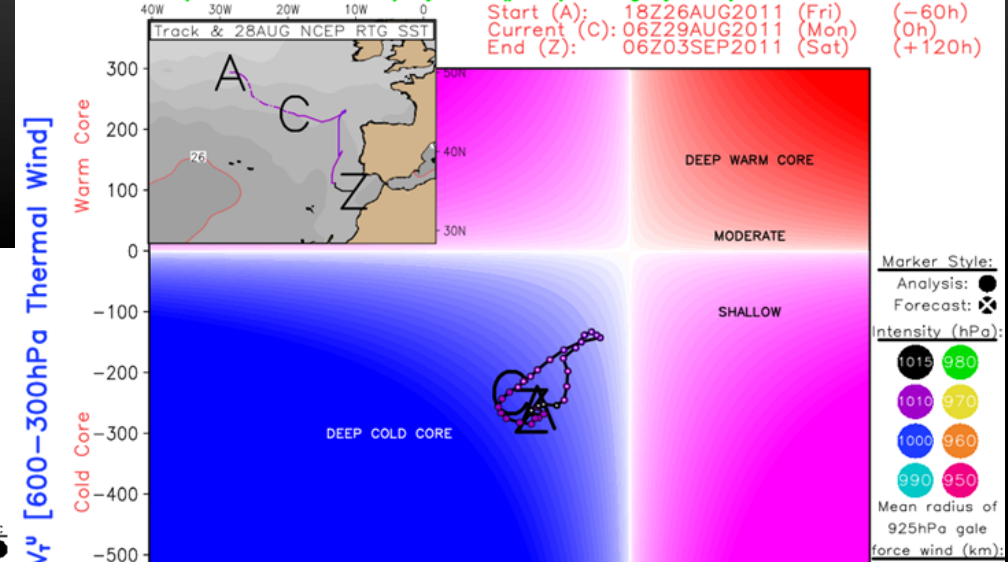
A low-pressure system existing in the tropical or subtropical latitudes that has characteristics of both tropical cyclones and extratropical (or mid-latitudes) cyclones

PHASE DIAGRAM: SUBTROPICAL/HYBRID VS TROPICAL AND EXTRATROPICAL

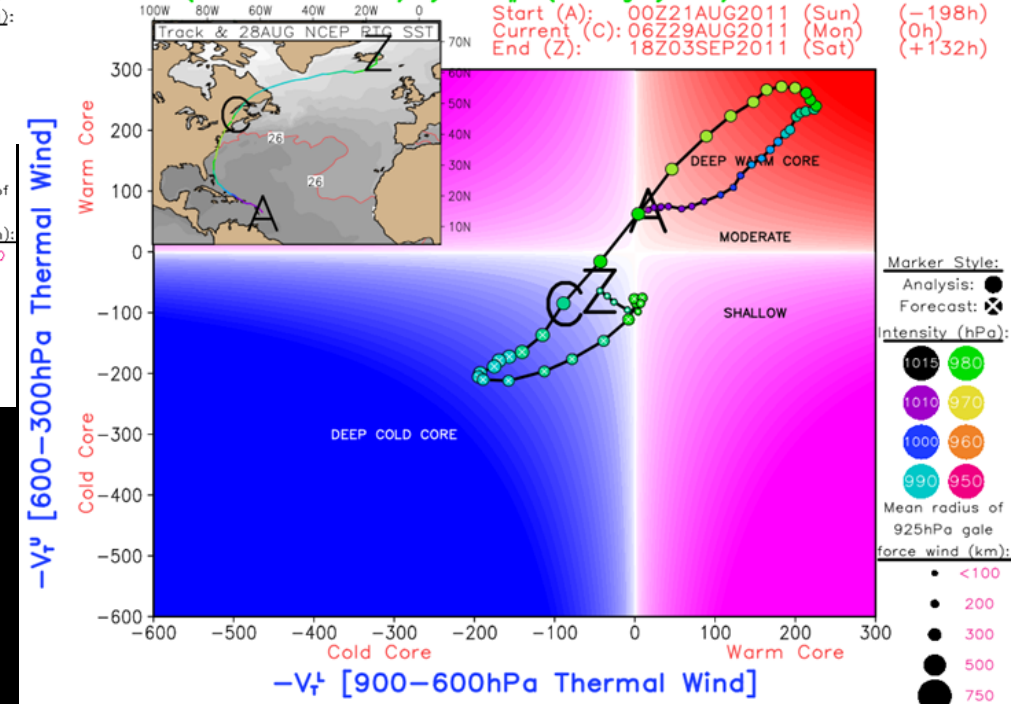
0.5° NCEP GFS (12Z02FEB2010 run) Cyclone #1 (Existing cyclone)



0.5° NCEP GFS (06Z29AUG2011 run) Cyclone #15 (Existing cyclone)



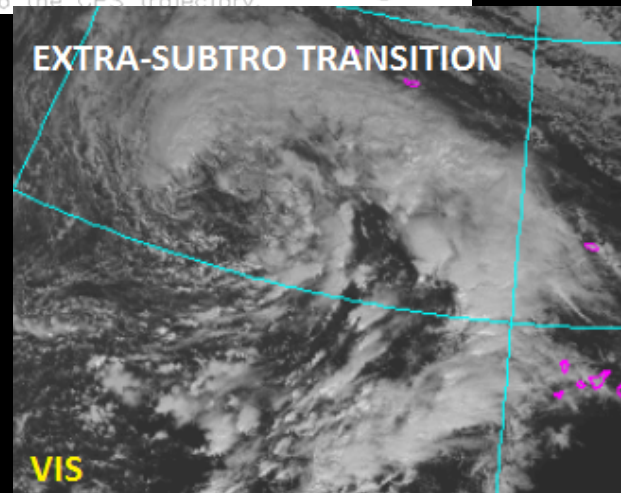
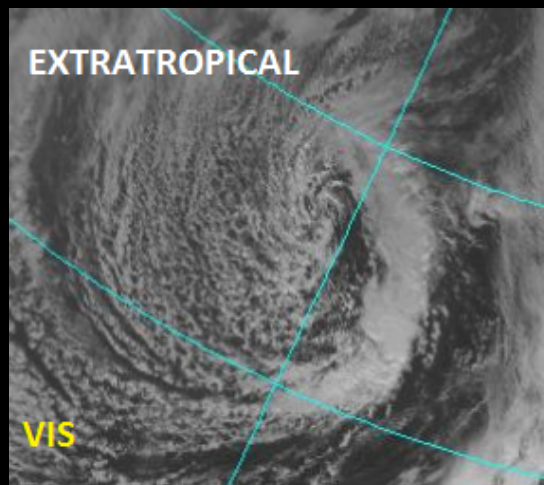
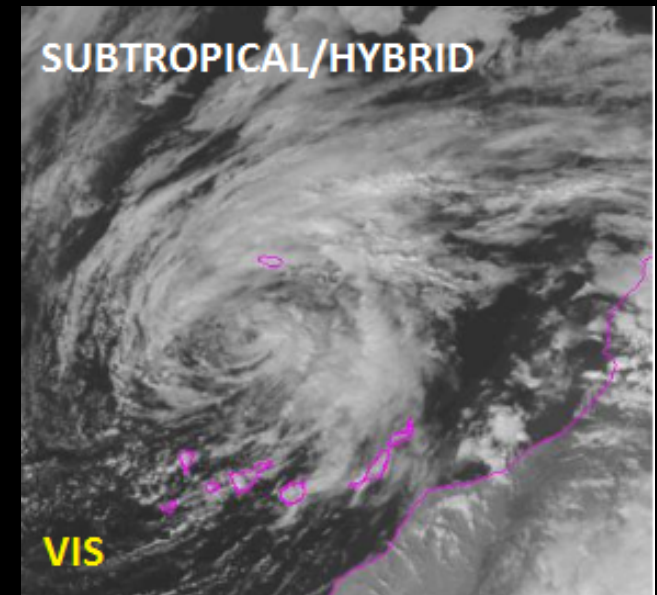
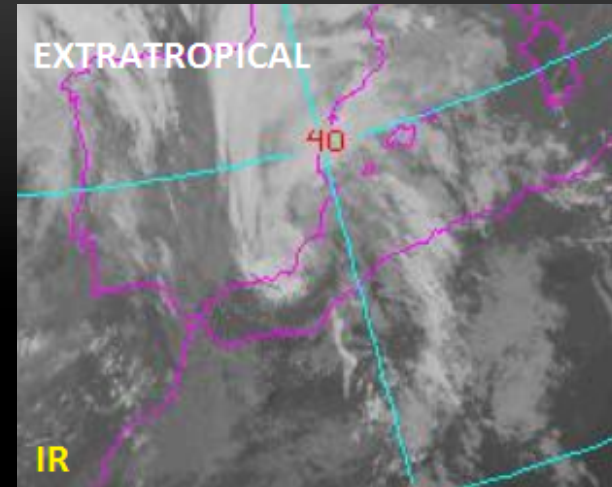
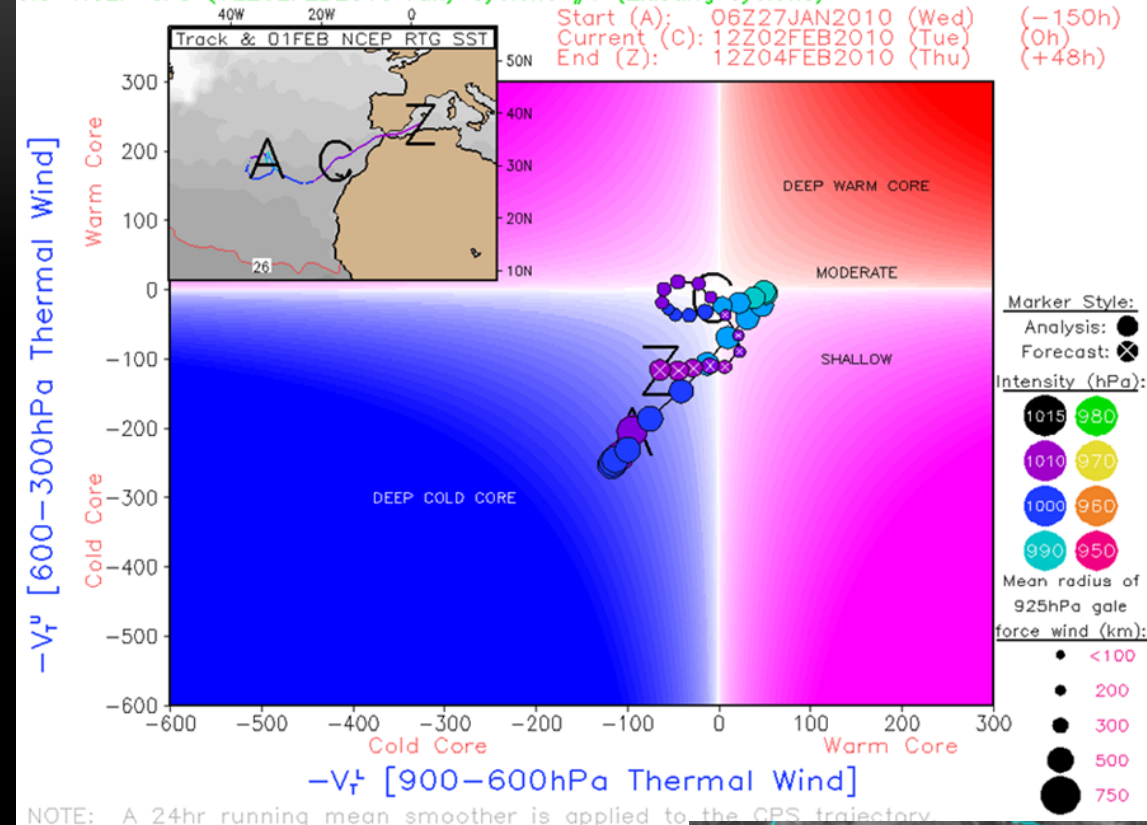
0.5° NCEP GFS (06Z29AUG2011 run) Cyclone #2 (Existing cyclone)



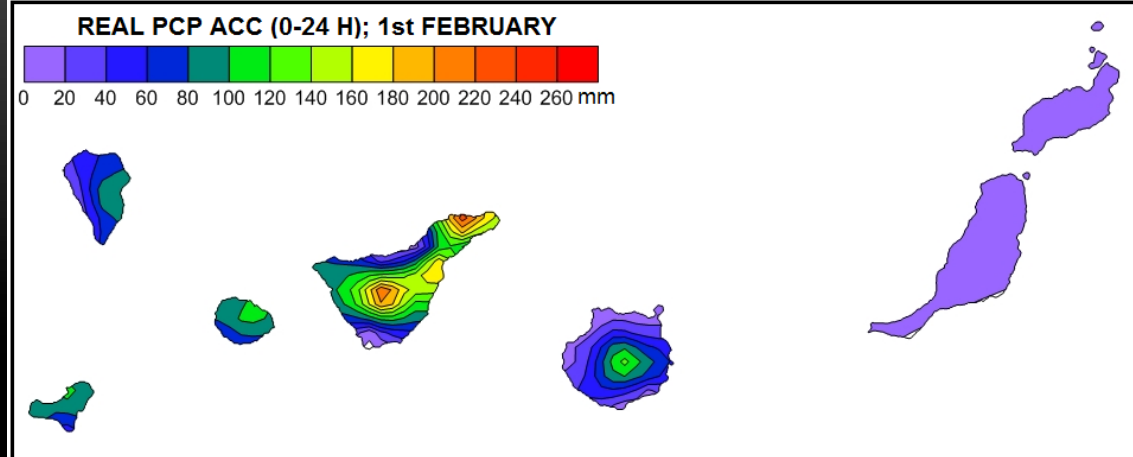
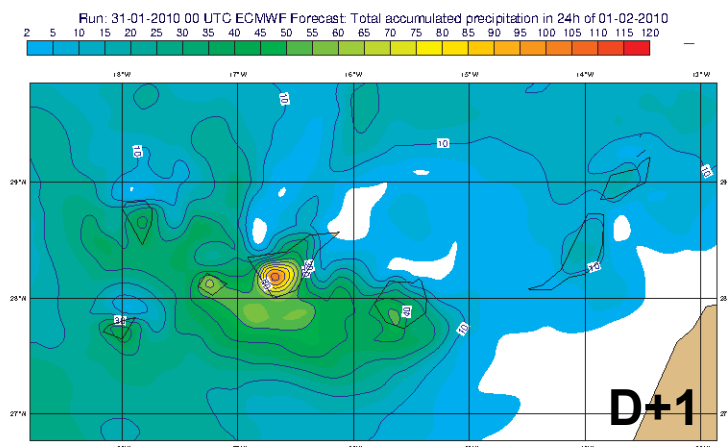
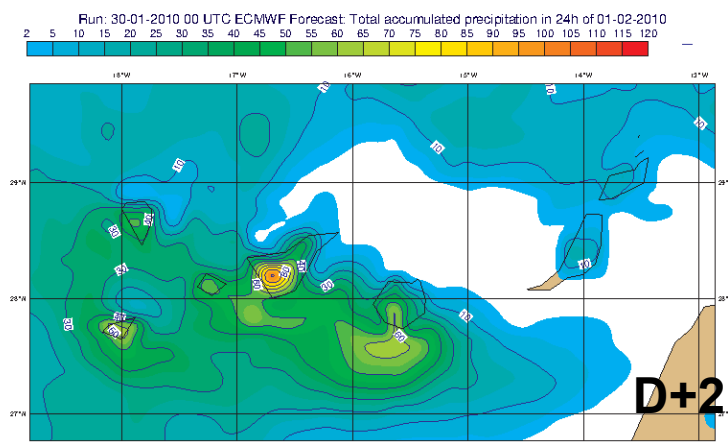
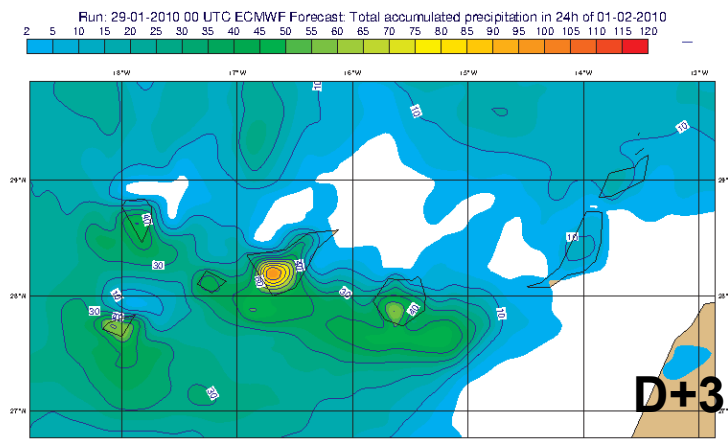
NOTE: A 24hr running mean smoother is applied to the CPS trajectory.

PHASE DIAGRAM

0.5° NCEP GFS (12Z02FEB2010 run) Cyclone #1 (Existing cyclone)



DETERMINISTIC MODEL (ECMWF) 1ST FEBRUARY



- The three rain forecasts were consistent.
- Rainfall distribution forecast: good quality except in the north of Tenerife Island.
- Rainfall accumulated forecast: underestimate. Máximo close 90 mm. Real more than 200mm.
- EFI (Extreme Forecast Index) and EPS same behaviour

SUMMARY

- **In early 2010 the atmosphere in the vicinity of Canary Islands:**
 - **Had more cyclones than usual.**
 - **Had good conditions to convection development.**
- **Within this scenario a transition from extratropical to subtropical/ hybrid cyclone was produced.**
- **The hybrid cyclone and several convective systems, helped by the orography, produced severe convective weather in several places of Canary Islands.**
- **All the models showed extreme rainfall events could happen, but the severe values were underestimated and some land location were misplaced.**

*Thank you very much
for the attention!*

Acknowledgments:

This job is part of a larger study elaborated by many people owned AEMET.
Thank them all.

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