NUMERICAL WEATHER PREDICTION IN MOROCCO 2015

Direction de la Météorologie Nationale, Casablanca, Morocco

Computing Platform

• **9 Physical Blade Center H :**

 − 114 shared memory nodes : 4 cores each, 16GB memory
 − 2 shared memory nodes : 8 cores each, 32GB memory
 • ~475 core in total

• 6 p520 network-I/O nodes, 8 cores, 16GB memory
• 2 Switch InfiniBand for I/O and MPI

 CPU : RISC/UNIX IBM Power6+ @4.2 GHz
 52 TB disk space
 ~ 1.95 TB memory,
 ~ 8.3 Tflops theoretical peak performance for application

Operational NWP suites

ALADIN/NORAF, ALADIN/MAROC, AROME/MAROC

	Horizontal Resolution	Vertical levels	Data assimilation	Range of forecast	Operation cycle	boundary conditions
ALADIN/NORAF	18km	60	Dynamical adaptation	72	CY38t1	ARPEGE Asynchronous
ALADIN/MAROC	10 km	60	Dynamical adaptation	72	CY38t1	ARPEGE Synchronous
AROME	2.5 km	60	Dynamical adaptation	36	CY38t1	ALADIN/MAROC

AROME/MAROC

Cycle: cy 38t1
Non-Hydrostatic/Resolution 2.5km/60 vertical levels
2 runs / day 00, 12 : 36-hour forecast range
1-hour coupling frequency

Preoperational NWP suites

Cycle: cy 40op2
70 vertical levels: ALADIN/NORAF ALADIN/MAROC
90 vertical levels: AROME/MAROC

Processing and assimilating ground based GPS data from the Moroccan network in ALADIN/MAROC
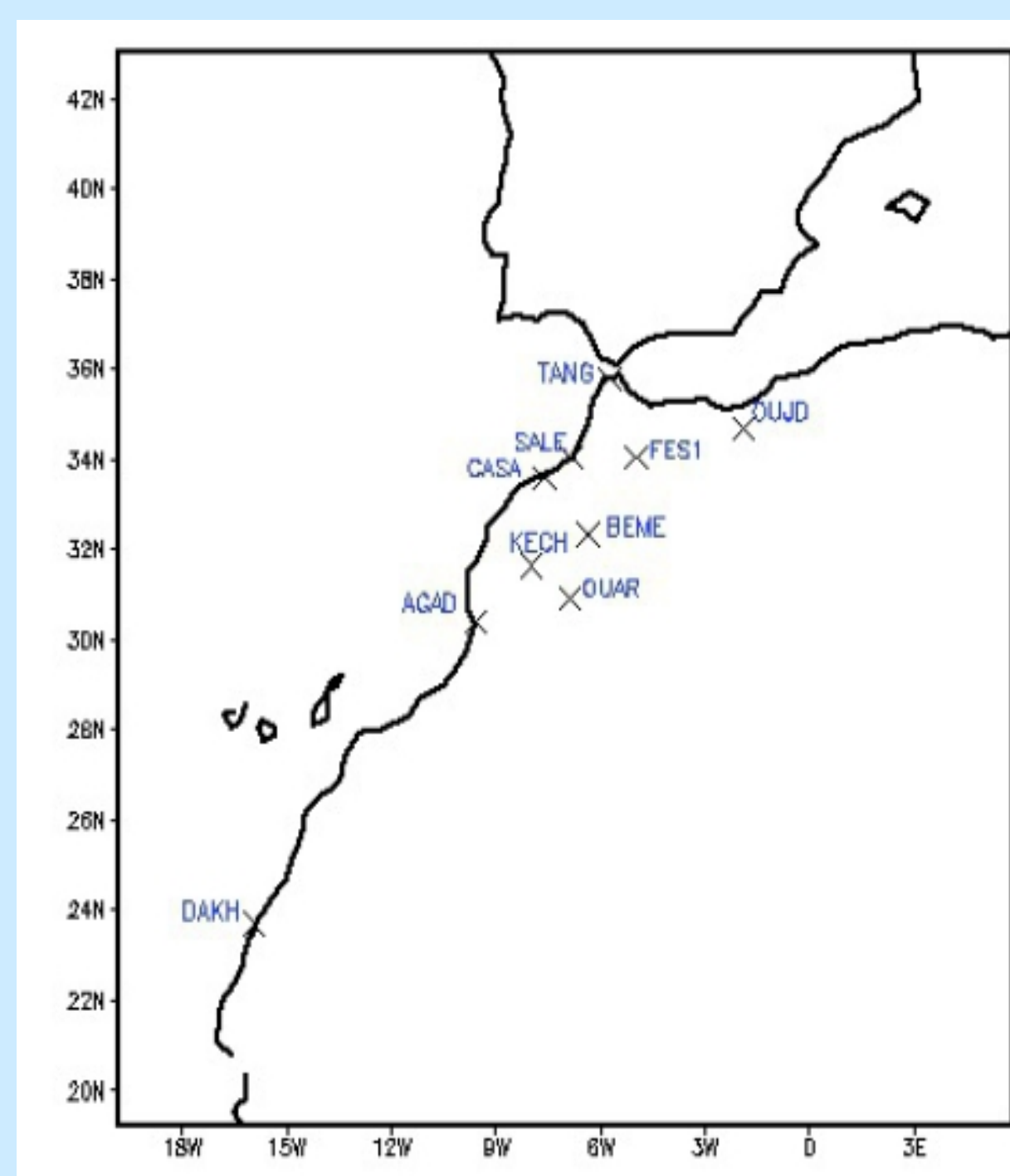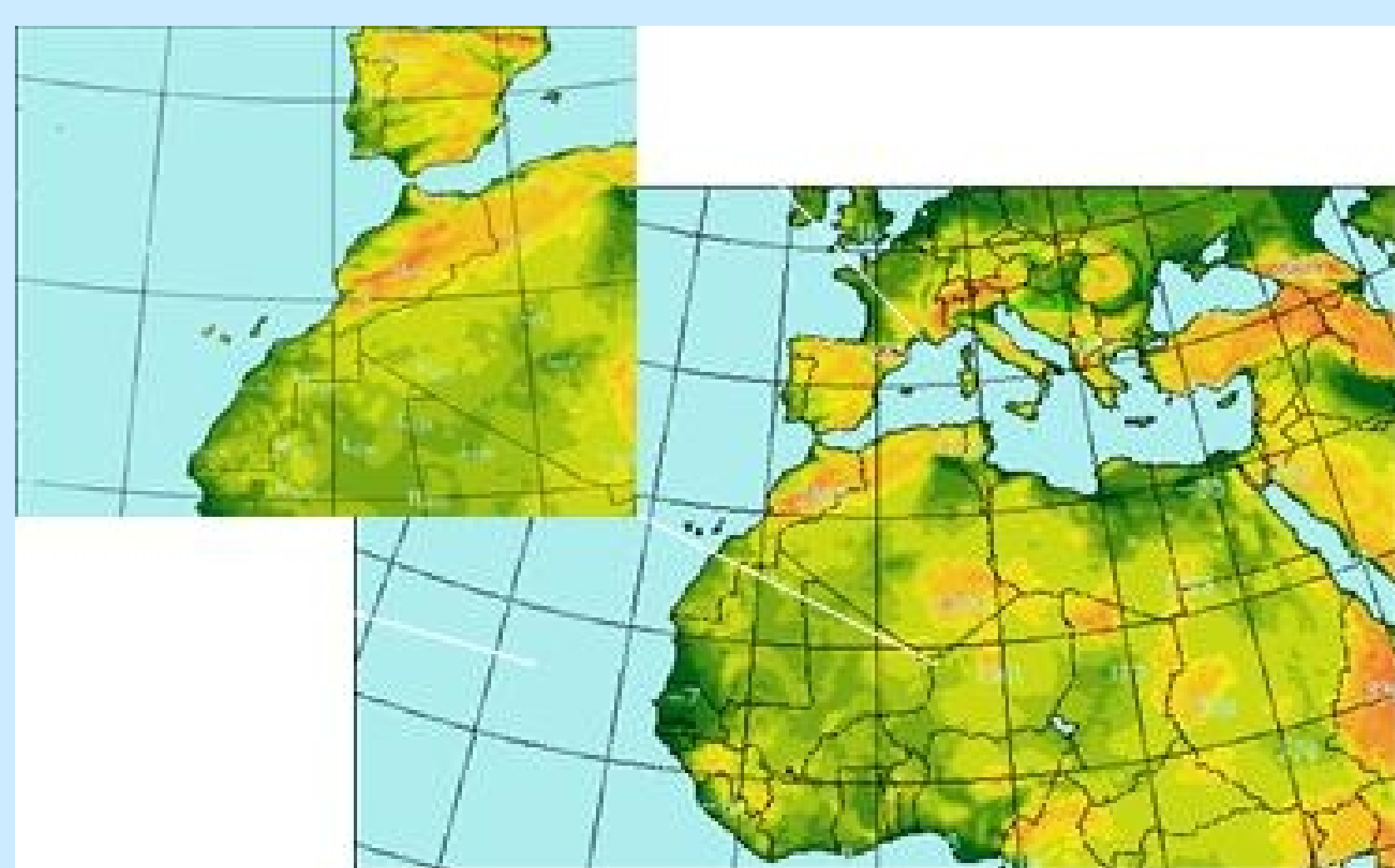

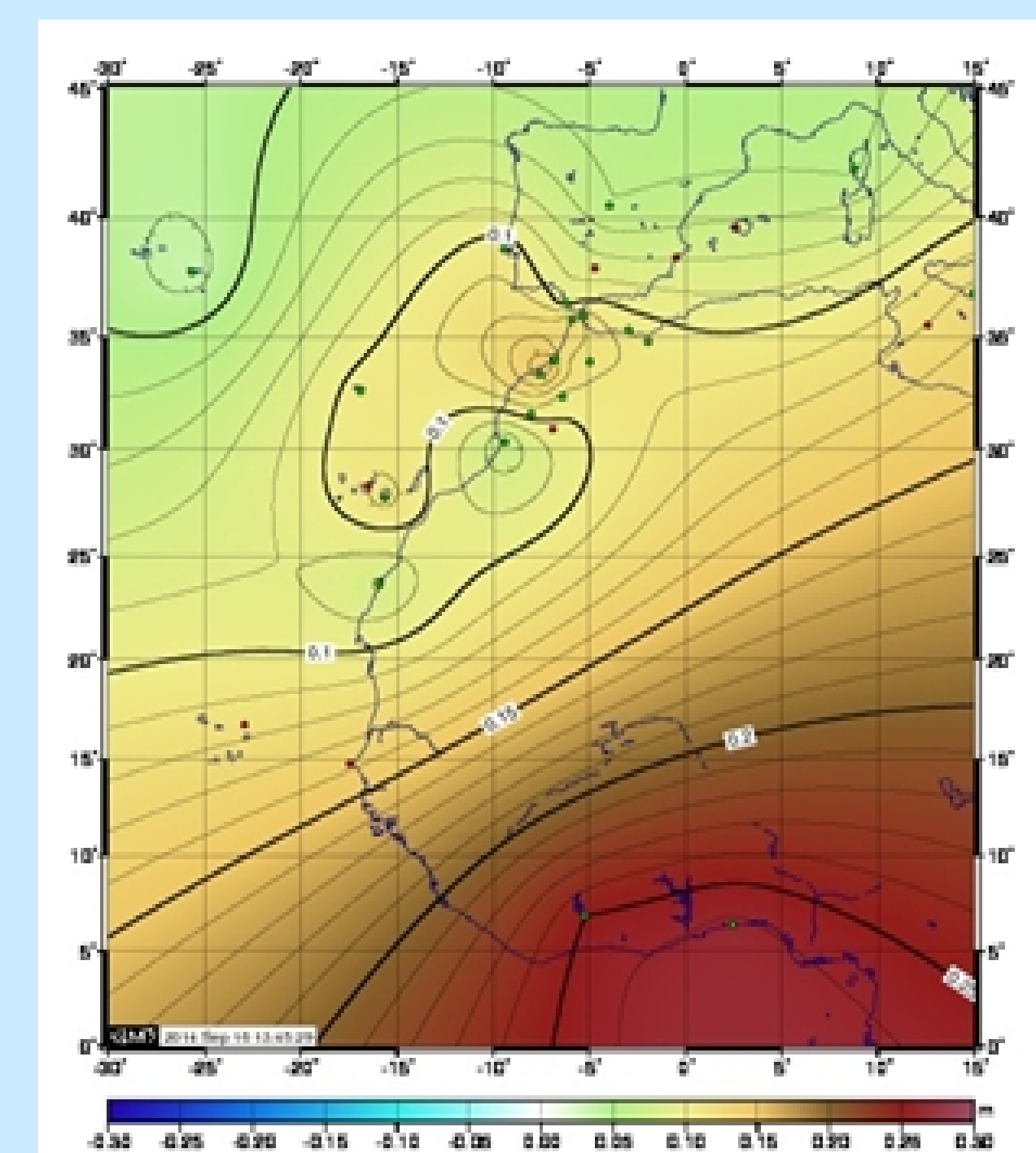**Figure 1 : GPS data coverage over morocco**

Figure 2 : ZTD map locally produced by BERNESE
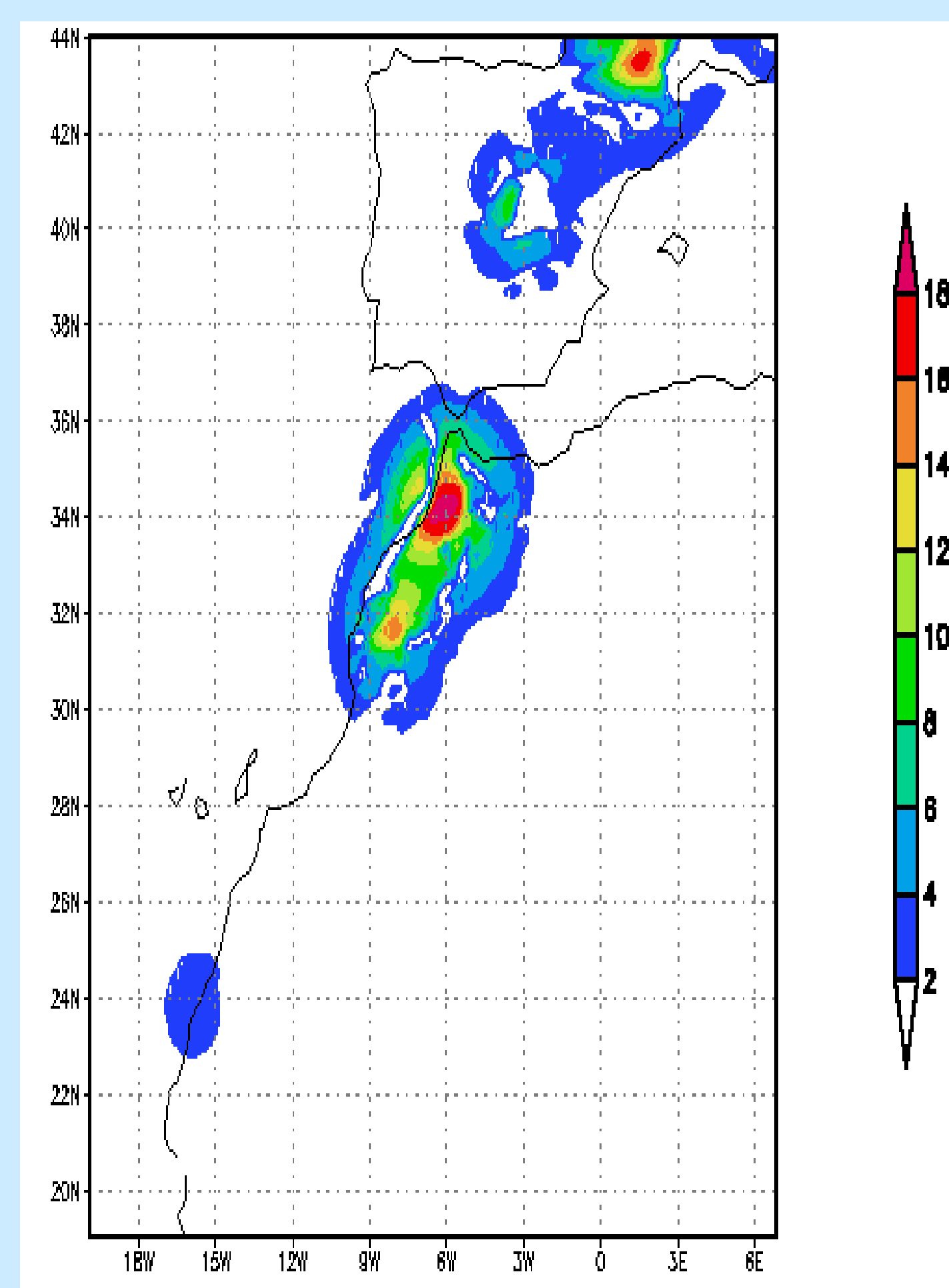
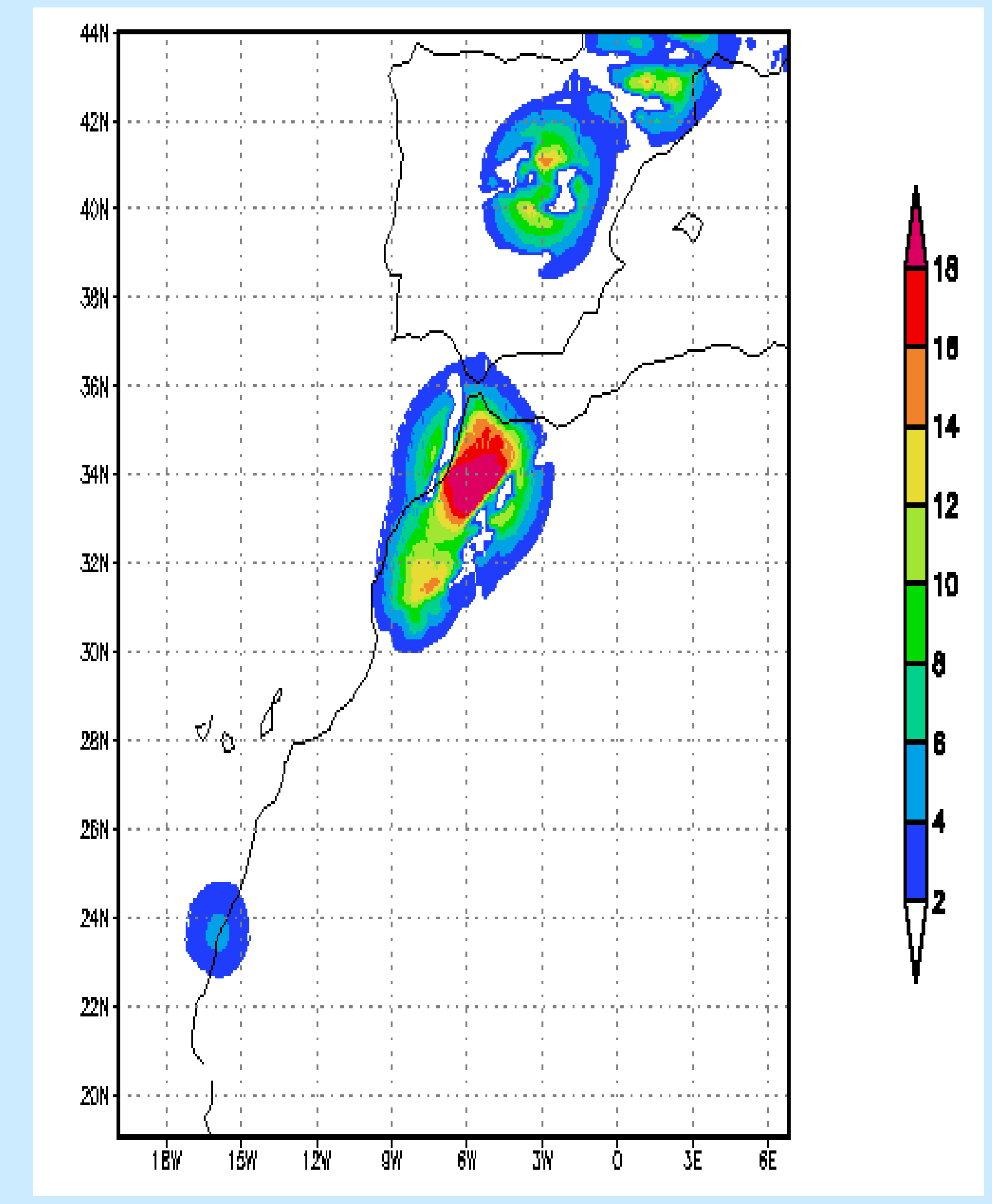**Figure 3: Relative humidity increments at 850 hPa**

Figure 4: Relative humidity increments at 700 hPa

GPS delay is very sensitive to the water vapor in the atmosphere and the assimilation of ZTD in NWP has an important impact especially in rainy situation.

10 ground-based GPS stations are installed in different Moroccan synoptic stations (Figure 1). Data from this network is collected in real time and stored in a local server. Data from IGS website is also downloaded, especially from GPS stations inside and around ALADIN-MAROC domain. A suite for high quality coordinate calculation based on BERNESE software has been implemented and validated. BERNESE software provides also ZTD (zenith total delay) data (Figure 2).

The assimilation of ZTD data in ALADIN-Morocco model starts by performing monitoring of locally produced ZTD data.

The assimilation of ZTD produced from Moroccan network and IGS data generates humidity increments from surface to above 500hPa. Figure 3 shows humidity increment at 850 hPa, figure 4 at 700hPa. The relative humidity increment reaches 18% in the north of Morocco, well covered by GPS data as shown in Figure 1. The increment in the south of Morocco corresponds to data from DAKHLA (DAKH) GPS station.