26-30 August 2013. Two cases of heavy rain and intense thunderstorms in the Western Mediterranean

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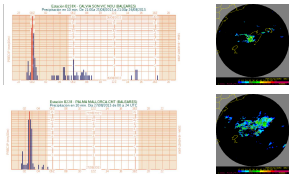
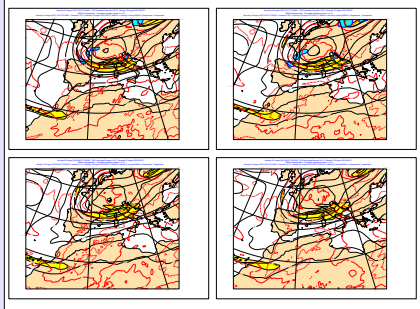
The implementation of the ECMWF cycle 38r2, on June 2013, mainly consisted on an increase of the number of vertical levels from 91 to 137, in the high-resolution forecast model (HRES) No change in horizontal resolution of HRES was included, although some changes or revisions were finally introduced on the different components in order to maintain its consistency, particularly the EDA, the main assimilation (4DVAR) and the ENS.
After the change, some loss of spread was detected at the ENS, especially for short ranges. In spite of the improvement that the new version introduced for the summer convection inland, the loss of spread led to a loss of accuracy for the occurrence of heavy rain in the same or other areas. That increased the unpredictability for some events at short ranges.

This presentation illustrates the real time evolution of two consecutive weather systems that affected Iberia and the Balearic Islands during the last week on August 2013. The first one occurred mainly during the night and almost over the sea or coastal areas. The second one consisted on a cut-off that crossed mainland Spain from Galicia to the Southeast going to the Mediterranean south of the islands.
Everything occurred at the end of August. The dynamic forcing was not very strong, what made more uncomprehensible the presence of rainfall quantities greater than 40 mm in one hour or 100 mm in 24 hours in the morning or the night. At the end, that was a key point for suspecting about some loss of spread at short ranges.

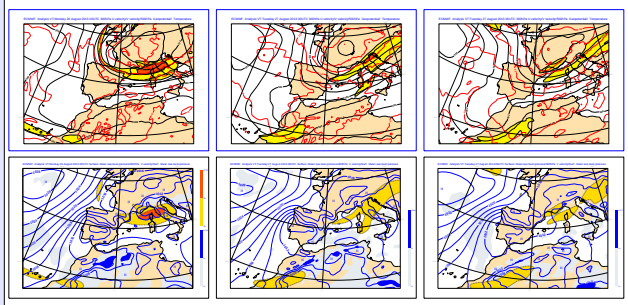
26-27 August 2013

26/08/2013	PCP (mm/1h)	Time (UTC)
Calvià Son Vic Nou (Mallorca)	42.2	0030
Chelva (Valencia)	19.8	0200
Llíria (Valencia)	27.6	0300
Oliva (Valencia)	20.04	0930
27/08/2013		
Calvià Son Vic Nou (Mallorca)	33.0	0240
Palma Portopi (CMT)	40.8	0310
Muro (Mallorca)	44.4	0400
Colonia S. Pere (Mallorca)	39.8	0420
Alcoy (Alicante)	44.0	1550
Villena (Alicante)	30.2	1320

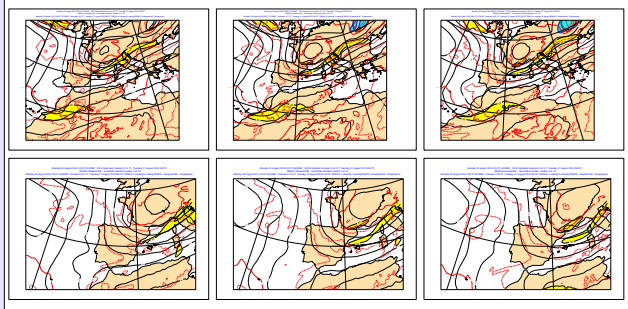


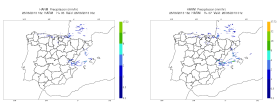


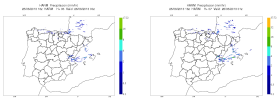
As a consequence of the large scale low (cut-off) over Western Europe, a western flow is established on the WM at upper levels. The flow is not strong and it remains quasi stationary during the 26th. Only speeds greater then 40 m/s are observed south of the Alps (green cont. at the forecast output, the 24th at 12 UTC, H+36, H+39; red contour Analysis, below fig., respectively). No strong forcing is observed at upper levels over the Med. coast of Spain and the Balearics. An eastern wind (mot shown at the forecast charts) is blowing in the area at mean sea level. That eastern flow is clearer in the MSP Ensemble Mean at the EnDA charts (The standard deviation computed without any filtering somen days after the event).
Some spread (Z300) is detected at upper levels in relation to the extremes of the jet stream. Those areas of spread could be related to the agesostrophic nonlinear flows develoed in those ares, of smaller scale of the main flux. No spread at all is observed at the south flank of the jet, north of the islands, So. it is not trivial to relate the convection on the Baearics in relation to the jet. No Z300 spread is appreciated beyond H+39 (24 at 12 UTC run).

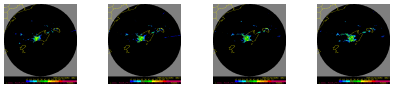


FSince the perspective of sinoptic meteorology, simmilar reasons can be argued for the 24 h later thunderstorm occurred over Palma (Porto Pi), port of Palma on the 27. However, there are some differences between the two events. Calvià is at the southwest edge of the island, and regularly it is 'surprised by some severe, hazardous weather events. Palma is in the extrem of the harbour. The heavy rain occurred in a commercial port, qitha lot of activity, along the night included. More than 50 % of the population of the island live or work in Palma. 40 mm in 1 hour is probably a record of intensity of heavy rain)









28-30 August 2013

28/08/2013	PCP (mm/1h)	Time (UTC)
Segorbe (Castellón)	20.8	1540
Enguera (Valencia)	30.2	1530
Oliva (Valencia)	55.4	1730
Alicante	43.2	2220
Caravaca (Murcia)	30.6	1630
Jumilla (Murcia)	36.2	1630
Los Royos (Murcia)	30.6	1630
29/08/2013		
Torres (Jaen)	27.6	0450
Fuente Palmera (Córdoba)	51.6 (112.8 mm/24h)	0500
Calá (Huelva)	52.4	1210
Cádiz	47.0	1310
Cabezas S Juan (Sevilla)	51.8	1530
Calasparra (Murcia)	48.0	0850

For 00 and 12 UTC runs