Area Forecast Discussion: Innsbruck, Austria and Casablanca, Morocco
Date: Tuesday 02 April 2019
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Big Picture Perspective

A continuing trend for a final warming event is seen in the forecast period as 10-hPa winds at 65˚N weaken and possibly become easterly by mid-April. This trend is reflected in the -AO forecast in early April, this corresponds with anomalously high heights over Greenland. With this blocking pattern in place, Europe and Northern Africa will experience troughing and low height anomalies causing a cold start to spring. Using the results of the ECMWF newsletter study on cold spells in Europe there is indication for cold temperatures to occur because of the forecasted -NAO and Scandanavian blocking, backing up the troughing that may occur. The MJO has and is forecasted to remain week during the period, offering limited predictability.

Extended Range: Day 7-10

Much of Europe will stay near climatological 500 hPa geopotential heights during this period with 2 closed troughs propagating eastward across the Mediterranean, close to the very zonal subtropical jet stream in northern Africa. The cutoff low in northern Europe will continue to propagate westward into the North Sea, but there is some variations in the forecasted track once in the North Sea. The lack of a strong trough or ridge signal in the deformation zone will leave central Europe with slightly warmer than normal temperatures throughout the period. Some light rain is forecasted for Innsbruck in the beginning of the period due to mechanical lifting from the mountains. The second cyclone moving in may bring some precipitation due to cyclonic vorticity advection at the end of the period. The more westward cyclone will also bring more onshore flow into Morocco which combined with the weak Q-vector convergence will cause light rain in Casablanca towards the beginning of the period. Casablanca will stay dry for the remainder of the period with anomalously cold temperatures.

Medium Range: Day 4-6

During this period the large cutoff anticyclone, which was created by an anticyclonic wave breaking event near Greenland, will move into Scandinavia and will be meridionally deformed due to cyclonic wave breaking to the north and an easterly jet to the south. The anticyclone continuing to rotate anticyclonically will cut off a PV streamer over the Baltic Sea. There is some variation in the models as to how the cutoff

cyclone will propagate, but they all show a general westward propagation towards the North Sea and Norway. Central Europe will have weak steering flow as the trough over the eastern Atlantic digs towards northern Africa to superimpose with the stronger subtropical jet. By the end of the period, the trough will continue digging down into the Mediterranean. The trough digging towards the Mediterranean will produce onshore flow into Morocco bringing higher precipitable water values along with cyclonic vorticity advection to force precipitation in the first half of the period in Casablanca along with the slightly colder than normal temperatures. Innsbruck will have some precipitation at the beginning of the period because of a small cut off cyclone that split off of the closed trough in the east Atlantic. Innsbruck will stay near climatological temperatures throughout the period before more rain at the very end of the period.

Short Range: Day 0-3

Troughing builds in throughout Western Europe that extends into the Northern portion of Africa, associated with -3 to -4 sigma low height anomalies. Anticyclonic wave breaking occurs in the northern latitudes towards the end of the period causing higher pressure over Scandinavia and lower pressures over most of Europe. This configuration creates a classic Rex block that dominates most of the forecast region aiding in keeping most of Europe colder than climatology. Moisture transport from the tropical Atlantic reaches from Western Africa to Central Europe feeds into the low pressure. Orographic induced precipitation is likely as the moist air is forced up the mountain ranges in the region.

Probabilistic Forecast

Innsbruck, Austria:

Day 0-3:

Max Temp:	2ºC (10th),	3ºC (50th),	4ºC (90th)
Min Temp:	-4ºC (10th),	-8ºC (50th),	-11ºC (90th)
Precip:	1 mm (10th),	2 mm (50th),	3 mm (90th)

Day 4-6:

Max Temp:	6ºC (10th),	8ºC (50th),	10ºC (90th)
Min Temp:	-1ºC (10th),	-2ºC (50th),	-3ºC (90th)
Precip:	3 mm (10th),	5 mm (50th),	8 mm (90th)

Day 7-10:

Max Temp:	4ºC (10th),	6ºC (50th),	10ºC (90th)
Min Temp:	-2ºC (10th),	-4ºC (50th),	-5ºC (90th)

Precip: 4 mm (10th), 8 mm (50th), 9 mm (90th)

Casablanca, Morocco:

Day 0-3:
Max Temp: 1ºC (10th), 2ºC (50th), 3ºC (90th)
Min Temp: -1ºC (10th), 0ºC (50th), 1ºC (90th)
Precip: 4 mm(10th),8 mm (50th),10 mm (90th)

Day 4-6:
Max Temp: 2ºC (10th), 3ºC (50th), 4ºC (90th)
Min Temp: 0ºC (10th), 1ºC (50th), 1ºC (90th)
Precip: 3 mm (10th), 4 mm (50th), 5 mm (90th)

Day 7-10:
Max Temp: 2ºC (10th), 4ºC (50th), 5ºC (90th)
Min Temp: -2ºC (10th), -1ºC (50th), 0ºC (90th)
Precip: 3 mm (10th), 5 mm (50th), 8 mm (90th)