**Area Forecast Discussion: North Atlantic and Western Europe Date: Thursday 31 January 2019**
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## Big Picture Perspective

An atmospheric river associated with strong integrated vapor transport continues to dominate the Atlantic basin, reaching from the Caribbean into the Iberian Peninsula. The moisture flux wraps into two active cyclones tracking across the basin causing the dissipation of the atmospheric river. A cyclone originating from Canada becomes occluded as it propagates north towards Greenland. The low pressure to the east quickly gets swept to the northeast as it reaches the Iberian Peninsula by the progressing trough axis. Another Atlantic cyclone quickly spins up with forcing from cyclonic vorticity advection and tracks through the N. Atlantic with consistency between the models. Weak ridging begins to develop over Europe keeping the Iberian Peninsula dry as storms pass to the north and northeast. The forecast period ends with a more favorable pattern for precipitation throughout W. Europe as a trough starts digging as cold air advection increases.

## Extended Range: Day 7–10

Iceland continues to be bombarded by low pressure systems as Atlantic cyclones spin up and occlude to the north. Weak ridging begins to develop through the Iberian Peninsula, a d(prog)/dt shows a consistent trend in the model runs, although questions remain about the meridional extent of the ridge axis. Warmer than climatological temperatures possible as southwesterly wind dominates the region advecting in warm marine air. Orographic lift is possible throughout the mountainous regions but without sufficient moisture and low precipitable water content the Iberian Peninsula is likely to remain dry. At the end of the period a cyclone centered near the U.K. will drag precipitation through the region with the passage of the cold front with some agreement between the models.

## Medium Range: Day 4–6

The nearly stagnant trough over central Europe allows a ridge to continue building over western Europe, trapping the warm sector of the occluded north Atlantic cyclone. The strong anticyclonic circulation associated with the ridge keeping most of the vapor transport farther to the North will likely produce near climatological values of precipitable

water in Barcelona. The giant north Atlantic cyclonic circulation in the base of the trough will continue as the trough lifts, piling up over the ridge in western Europe. The low pressure center of the cyclone will split up due to strong Q-vector forcing on the downstream side of the cyclone, propagating the cyclone northeast towards Iceland. Long bands of precipitation will likely form on the southeast side of the cyclone bringing precipitation to Iceland, fueled by moisture pulled north from the central Atlantic and forced by strong frontogenesis as well as advection of vorticity by the thermal wind.

**Short Range: Day 0–3**

Strong vapor transport in the warm sector from the eastern Atlantic will contribute to widespread precipitation as the weakening north Atlantic cyclone makes it way through France and Spain. The Q-vector forcing supporting the cyclone will decrease during landfall, causing the low pressure center to move North to the inflection point downstream of the trough. Another cyclone will likely be able to spin up in the base of the trough as it stalls in central Europe, continuing to pull cold dry air from northern Europe down into the Mediterranean and northern Africa. A shortwave trough, in the thermal ridge dominating the Atlantic, bringing significant vorticity advection and slightly higher precipitable water values to Iceland will produce a short snow event ahead of the impending cyclone.

**Probabilistic Forecasts**

**Reykjavik, Iceland:**

Day 0-3:

Max Temp: -1ºC (10th), -3ºC (50th), -6ºC (90th)
Min Temp: -3ºC (10th), -7ºC (50th), -10ºC (90th)
Precip: 5 mm (10th), 15 mm (50th), 25 mm (90th)

Day 4-6:

Max Temp: -2ºC (10th), 0ºC (50th), 2ºC (90th)
Min Temp: 0ºC (10th), -1ºC (50th), -2ºC (90th)
Precip: 5 mm (10th), 15 mm (50th), 20 mm (90th)

Day 7-10:

Max Temp: -1ºC (10th), 0ºC (50th), 1ºC (90th)
Min Temp: 1ºC (10th), 0ºC (50th), -1ºC (90th)
Precip: 5 mm (10th), 10 mm (50th), 15 mm (90th)

**Barcelona, Spain:**

Day 0-3:

Max Temp: 10ºC (10th), 13ºC (50th), 14ºC (90th)
Min Temp: 1ºC (10th), 4ºC (50th), 6ºC (90th)
Precip: 0.0 mm (10th), 5 mm (50th), 10 mm (90th)

Day 4-6:

Max Temp: 12ºC (10th), 13ºC (50th), 16ºC (90th)
Min Temp: 3ºC (10th), 4ºC (50th), 5ºC (90th)
Precip: 0.0 mm (10th), 0.2 mm (50th), 0.3 mm (90th)

Day 7-10:

Max Temp: 13ºC (10th), 14ºC (50th), 16ºC (90th)
Min Temp: 4ºC (10th), 5ºC (50th), 6ºC (90th)
Precip: 5 mm (10th), 10 mm (50th), 15 mm (90th)