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Impact of a North Atlantic hurricane on the predictability of a Medicane

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The extratropical transition (ET) of a tropical cyclone is known as a source of forecast uncertainty that can propagate far downstream. The present study focuses on the predictability of a Mediterranean tropical-like storm (Medicane) on 26 September 2006 downstream of the ET of hurricane Helene from 22 to 25 September. While the development of the Medicane was missed in the deterministic forecasts from the European Centre for Medium-Range Weather Forecasts (ECMWF) initialized before and during ET, it was contained in the ECMWF ensemble forecasts in more than 10 % of the 50 members up to 108-h lead time. The 200 ensemble members initialized at 0000 UTC from 20 to 23 September were clustered into two nearly equiprobable scenarios after the synoptic situation over the Mediterranean. In the first and verifying scenario, Helene was steered northeastward by an upstream trough during ET and contributed to the building of a downstream ridge. A trough elongated further downstream towards Italy and enabled the development of the Medicane in 9 of 102 members. In the second and nonverifying scenario, Helene turned southeastward during ET and the downstream ridge building was reduced. A large-scale low over the British Isles dominated the circulation in Europe and only 1 of 98 members forecast the Medicane. The two scenarios resulted from a different phasing between Helene and the upstream trough. Sensitivity experiments performed with the Meso-NH model further revealed that initial perturbations targeted on Helene and the upstream trough were sufficient at forecasting the warm-core Medicane at 84-h and 108-h lead time. The mid-range predictability of further cases of severe weather in the Mediterranean will be investigated in the framework of the DRIHM project.