Published as: Smart, D; (2020) Medicane 'Ianos' over the central Mediterranean 14-20 September 2020. WEATHER , 75 (11) pp. 352-353. 10.1002/wea.3871

Spotlight: Medicane *'Ianos'* over the central Mediterranean 14-20 September 2020

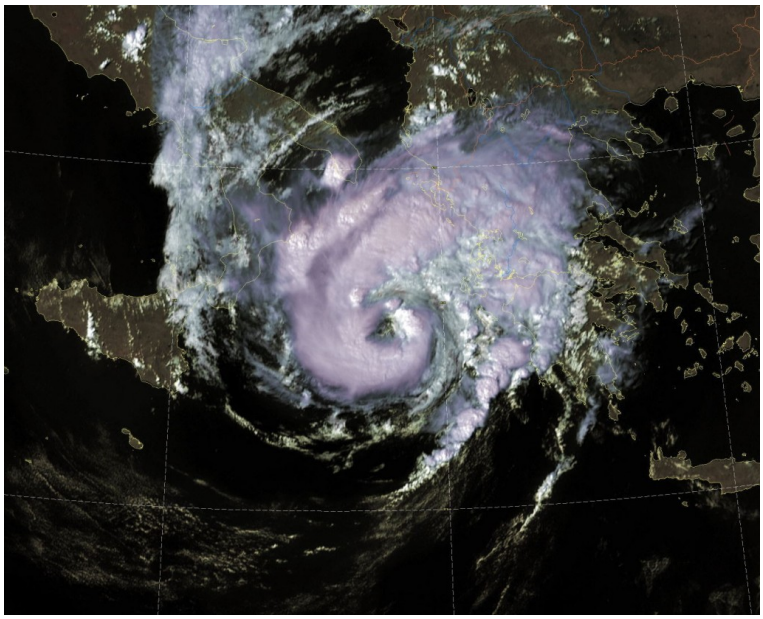

Figure 1: A VIIRS (Visible Infrared Imaging Radiometer Suite, on board Suomi NPP) image of Medicane *'Ianos'* at 13 UTC on 17 September 2020. Note the spiralling bands of convection surrounding the eye-like feature east of Sicily. The cirrus outflow from this convection merges to form a canopy south and west of the storm centre. (Courtesy NOAA/CIMMS)

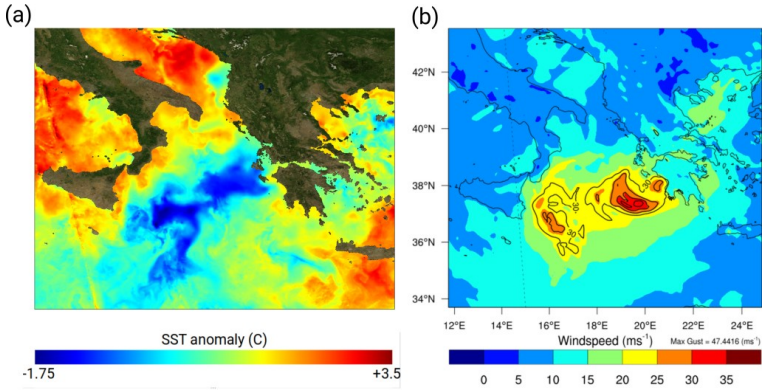

Figure 2: The storm induced sea surface temperature (SST) anomaly compared with modelled storm wind footprint. a) Satellite observed SST anomaly valid 00 UTC on 20 September (source: https://marine.copernicus.eu/about-us/about-producers/sst-tac/, accessed 21 September 2020). b) Time-integrated maximum 10-m mean wind speed (shaded) and diagnosed gusts (contours every 5 m/s starting at 30 m/s) obtained from a 72hr Weather Research and Forecasting (WRF) simulation initialised with ECMWF ERA5T reanalysis data at 00 UTC 16 September 2020. (Credits: EU Copernicus Marine Service/ ECMWF. Contains modified Copernicus Climate Change Service Information 2020)

Text:

Medicanes ('Mediterranean-Hurricanes') are intense cyclonic systems resembling tropical storms that

form over the warm waters of the Mediterranean sea, mostly during the autumn and early winter months. They are uncommon but are associated with severe weather including strong winds, coastal flooding and inland flooding from heavy rainfall in the Mediterranean basin (Dent and Mason, 1972; Ernst and Matson, 1983; Moscatello, 2008; Winstanley, 1970).

Medicane *'Ianos'* (as named by the Hellenic National Meteorological Service) initially formed from a cluster of convection off the Libyan coast on 14 September 2020. As with some previous cases (see for example Dent and Mason, 1972) cyclogenesis occurred as an upper-level vorticity anomaly penetrated equator-ward across the Mediterranean basin. Over the subsequent days the intensifying storm moved initially northward before making landfall over Greece late on the 17th of September. It then reversed direction, moving southwards over southern Greece before dissipating south of Crete on the 20th. Wind gusts on the Greek coast exceeded 69 mph leading to damage and coastal flooding with the islands of Kefalonia and Zakynthos being particularly affected. The BBC reported that heavy rainfall (in excess of 140mm in 24 hours) and strong winds over mainland Greece led to extensive flooding, landslides, power cuts, loss of homes and at least three fatalities. Prediction of the track and intensity of the storm by operational models was generally good providing useful guidance for national meteorological agencies.

Figure 1 shows a satellite image of the storm at midday on the 17th close to the time of its deepest central pressure (~993 hPa) according to both Met Office analyses and the ECMWF ERA5T reanalysis, having fallen from 1004 hPa on the 14th. The storm appears to possess many of the features commonly found in a tropical storm system including spiral bands of convection and an eye. Sea Surface Temperatures (SSTs) between Sicily and Greece were between 27-28C according to satellite observations. Figure 2(a) shows the Copernicus Marine Centre SST anomaly product for 20 September with a distinct negative SST anomaly of -1 to -2°C in the area. This can be compared with Figure 2(b) which shows the time-integrated mean wind speed and wind gust footprint from a 7.5 km grid spacing Weather Research and Forecasting (WRF) model run initialised with ERA5T reanalysis data at 00 UTC on 14 September and integrated for 72 hr. The simulation produces a storm similar to that observed with a quasi-symmetric structure and warm core (not shown). Cooling of the top layer of the ocean by hurricanes has long been documented in the North Atlantic basin and is attributed to mixing and upwelling of cold water by strong surface winds (see for example Leipper, 1967). To the author's knowledge this is the first published documentation of observations of the effect due to a Mediterranean system having tropical characteristics.

David Smart, UCL Hazard Centre, University College London d.smart@ucl.ac.uk

References:

Dent, I. And Mason, D.C. 1972. A Study of Rapid Cyclonic Development over the Central Mediterranean in September 1969. Met. Mag. 101: 78-85.

Ernst, J.A. and Matson, M. 1983. A Mediterranean Tropical Storm? Weather 38: 332-337.

Leipper, D. F. 1967. Observed Ocean Conditions and Hurricane Hilda, 1964. J. Atmos. Sci. 24: 182–186.

Moscatello, A., Marcello Miglietta, M. and Rotunno, R. 2008. Observational analysis of a Mediterranean 'hurricane' over south-eastern Italy. Weather 63: 306-311.

Winstanley, D. 1970. The North African Flood Disaster, September 1969. Weather 25: 390-403.