

Tropical Cyclone Chapala

28 October 2015 - 4 November 2015

southern Oman, Yemen and Socotra



Desert Locust Information Service

FAO, Rome

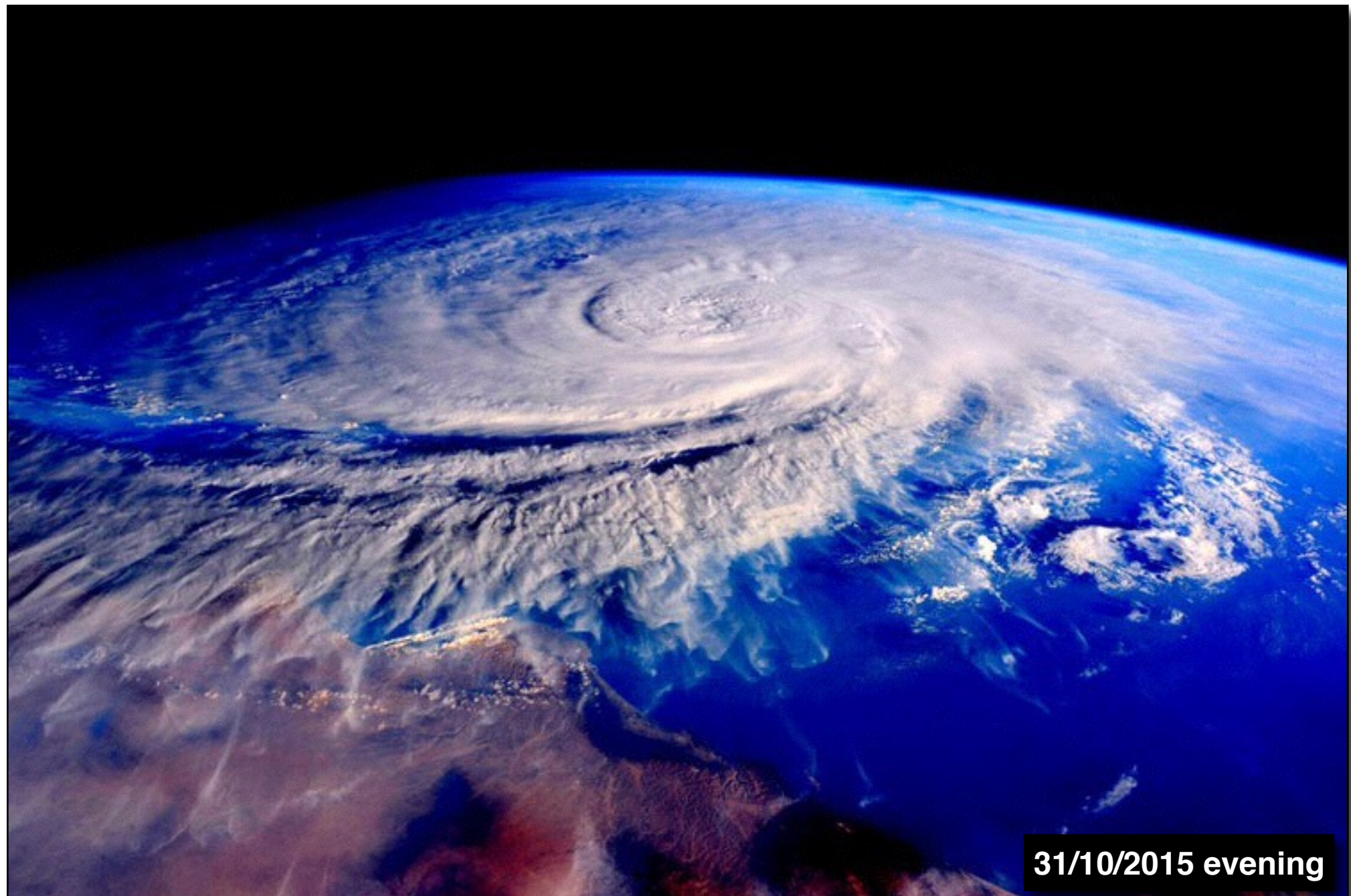
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Keith Cressman (Senior Locust Forecasting Officer)



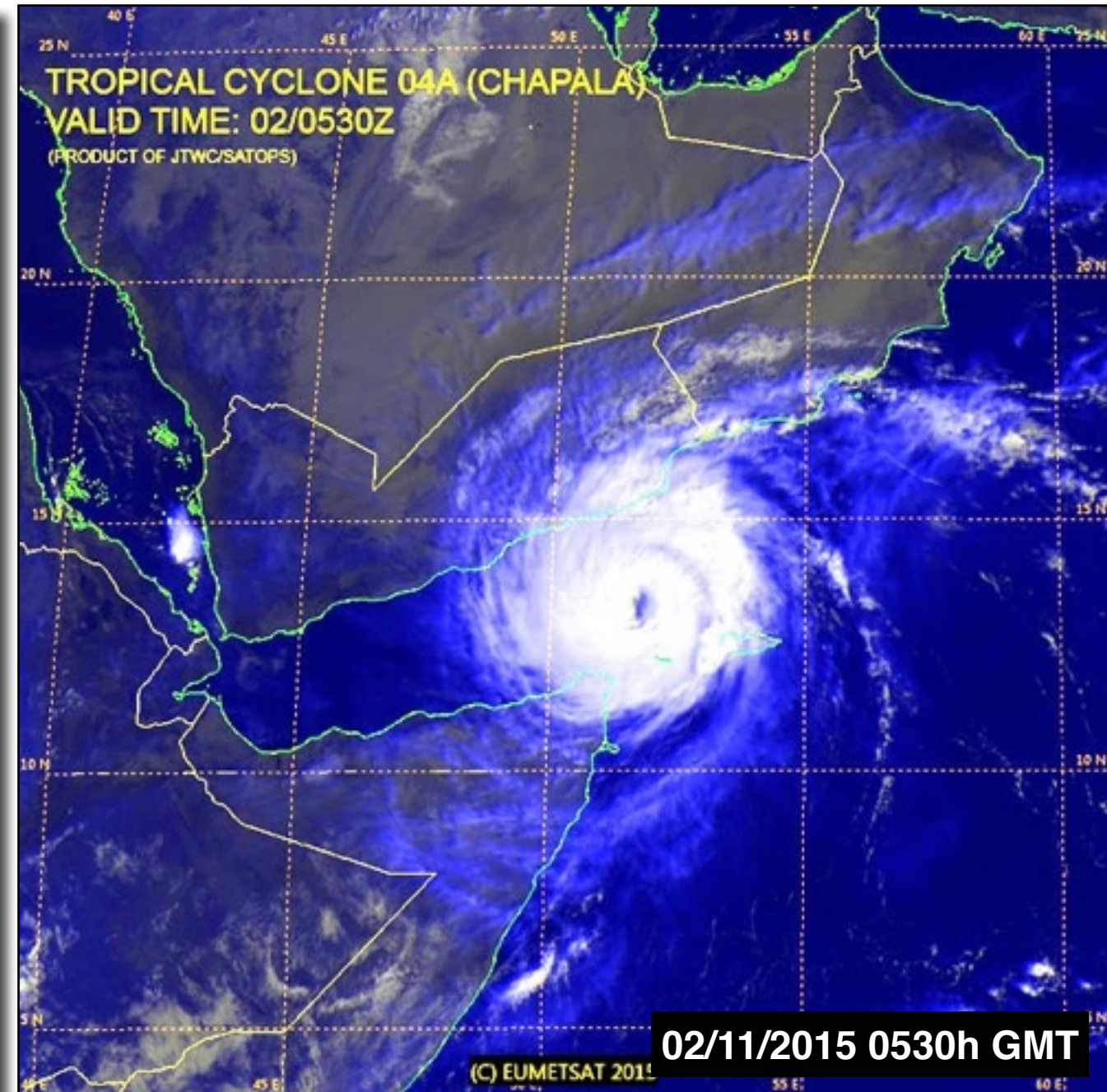
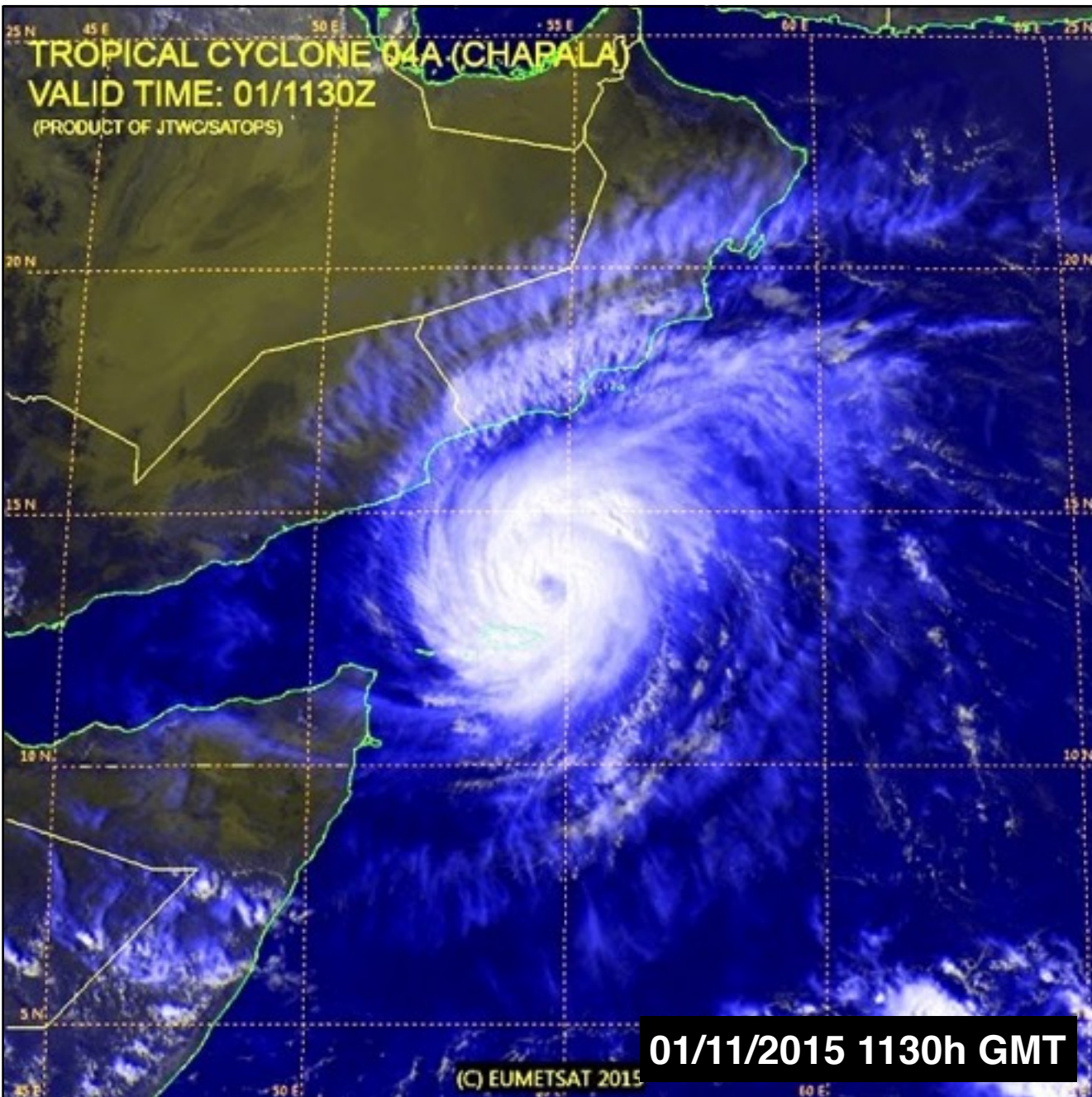
Tropical cyclone Chapala - position (31 October 2015, morning)

Tropical cyclone Chapala is the second strongest storm on record for the Arabian Sea. Since 30 October, it has been moving towards the southern coast of Yemen. Winds were initially as strong as 250 km/h on Friday 30 October but declined to 220 km/h on Saturday morning 31 October. (*source: MODIS*)



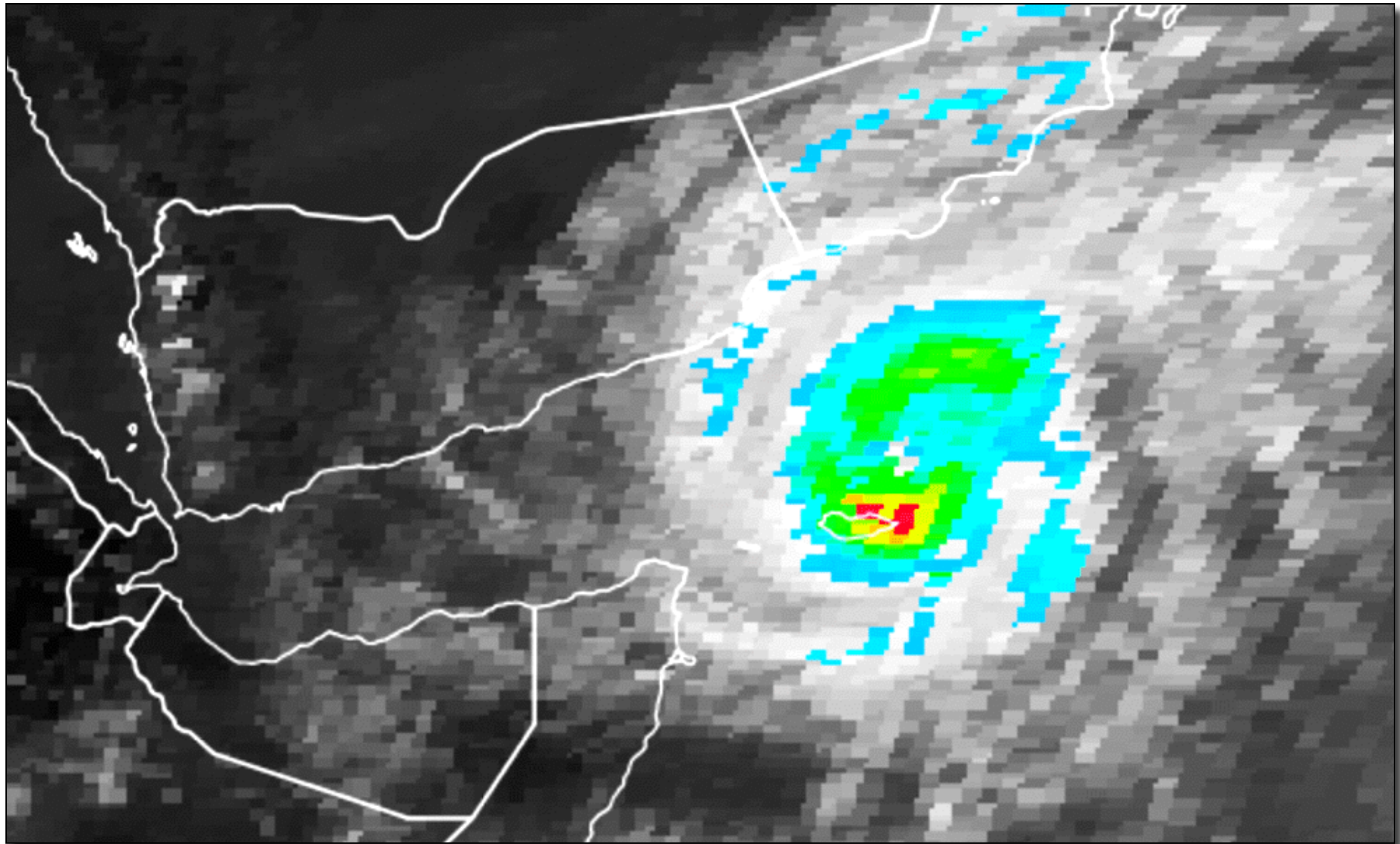
Tropical cyclone Chapala - position (31 October 2015, evening)

Tropical cyclone Chapala as seen from the International Space Station at sunset on 31 October. At that time, Chapala was a Category 4 storm with 220-250 km/h winds. The coast of Oman and Yemen is visible at the bottom of the image. *(source: Commander Scott Kelly)*



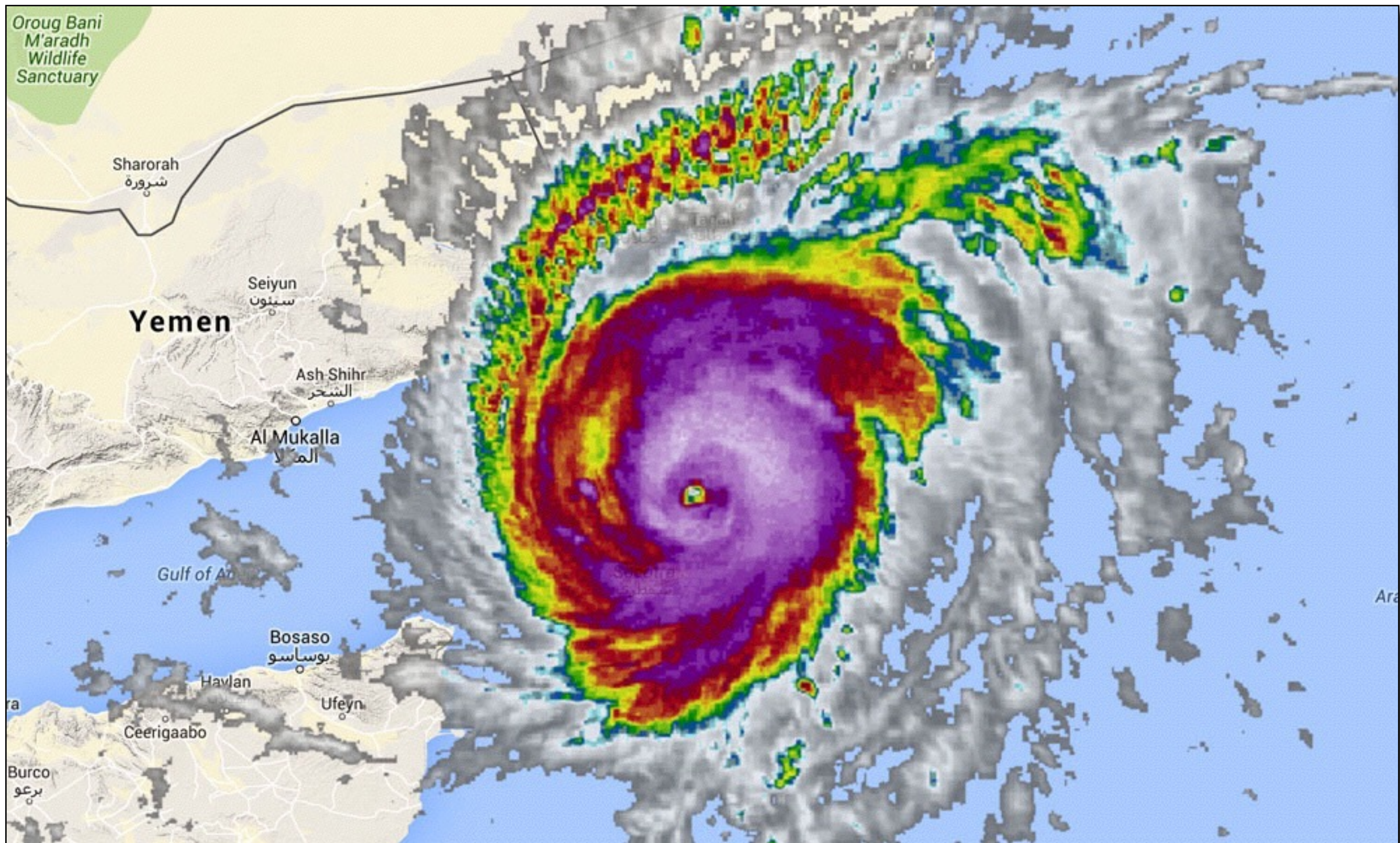
Tropical cyclone Chapala - position moves towards southern coast of Yemen (1-2 November 2015)

Tropical cyclone Chapala was located off the coast of southern Oman and eastern Yemen, approximately 600 km east of Mukulla, Yemen on 1 November. By the morning of the following day, it was only 300 km from Mukulla and had nearly passed west of the island of Socotra, Yemen. Clouds associated with the cyclone can be seen over the coast of eastern Yemen. (source: JTWC/SATOPS)



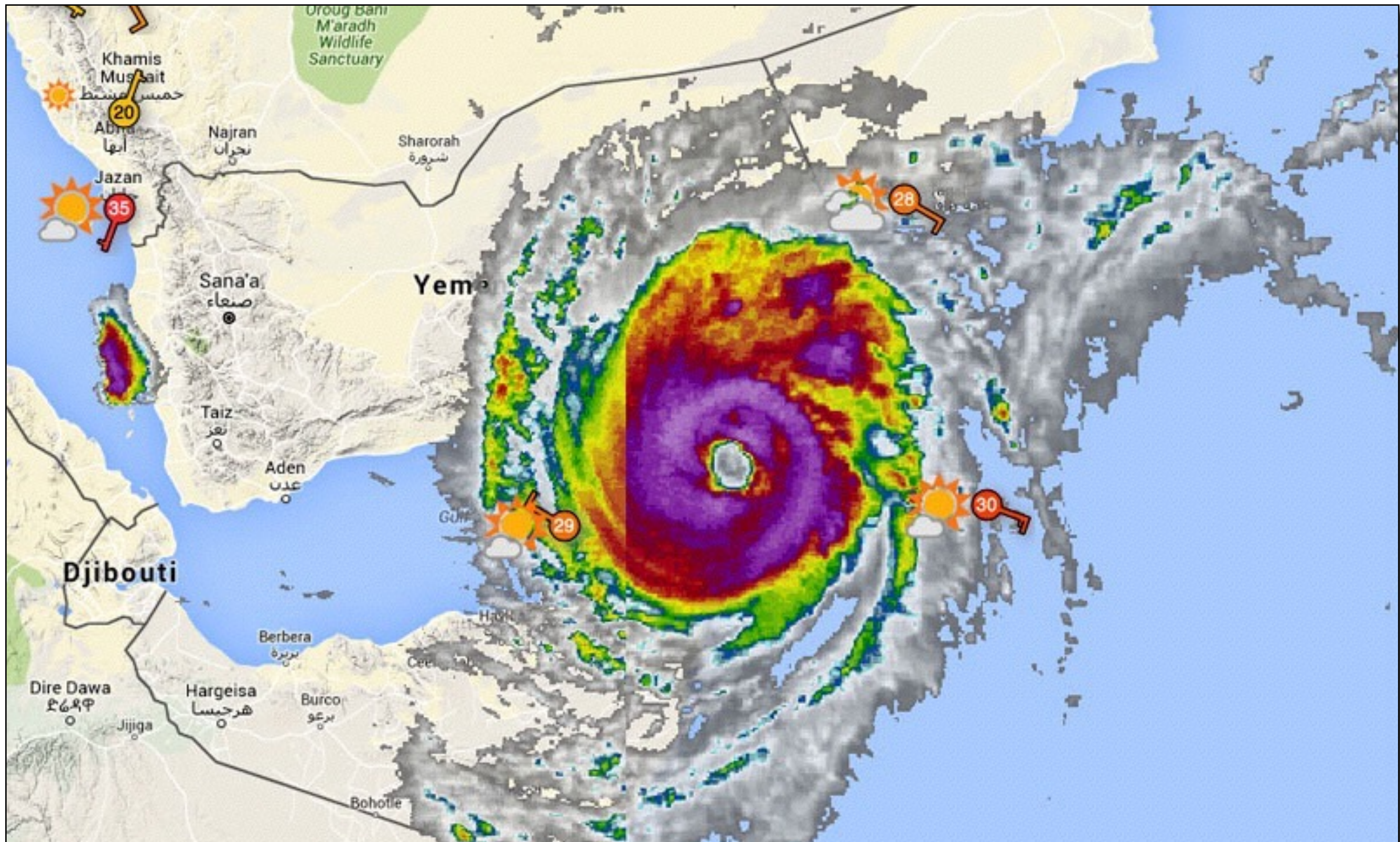
Tropical cyclone Chapala - latest rainfall estimate (1 November 2015, 1345h GMT)

The latest estimated rainfall from Tropical cyclone Chapala located off the coast of southern Oman and eastern Yemen. Clouds associated with the cyclone can be seen over Salalah, Oman and Al Ghaydah, Yemen while potentially heavy rain may have fallen on the island of Socotra, Yemen. (*source: ECMWF MPE*)



Tropical cyclone Chapala - latest position (1 November 2015, 1400h GMT)

Tropical cyclone Chapala located off the coast of southern Oman and eastern Yemen. Clouds and rainfall associated with the cyclone can be seen over Salalah, Oman and Al Ghaydah, Yemen (*source: Wunderground*)



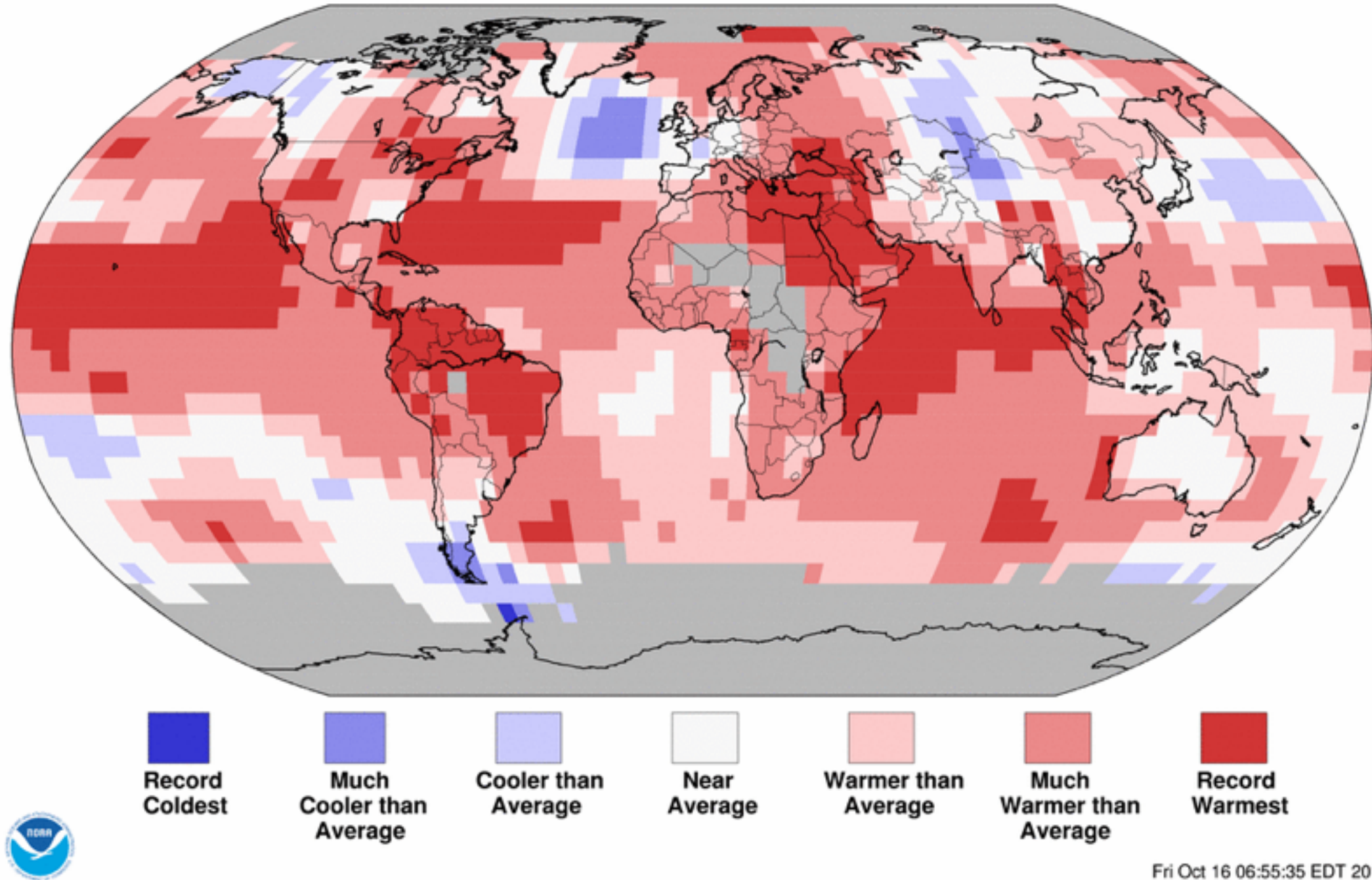
Tropical cyclone Chapala - latest position (2 November 2015, 0745 GMT)

Tropical cyclone Chapala located off the coast of southern Yemen, having passed over Socotra Island, bring heavy rains and destruction. Clouds associated with the cyclone can be seen over the interior of Yemen (*source: Wunderground*)

Land & Ocean Temperature Percentiles Sep 2015

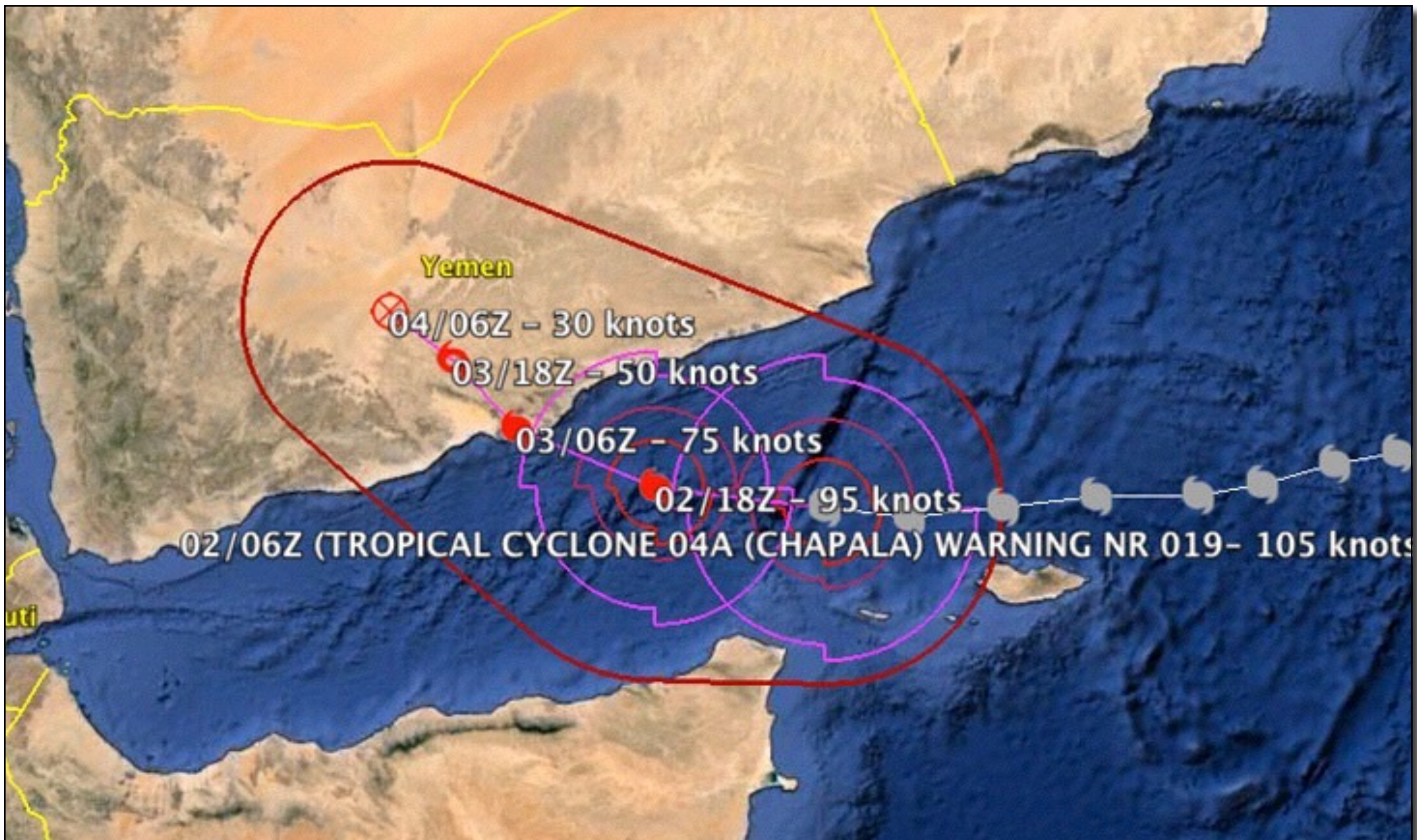
NOAA's National Centers for Environmental Information

Data Source: GHCN-M version 3.3.0 & ERSST version 4.0.0



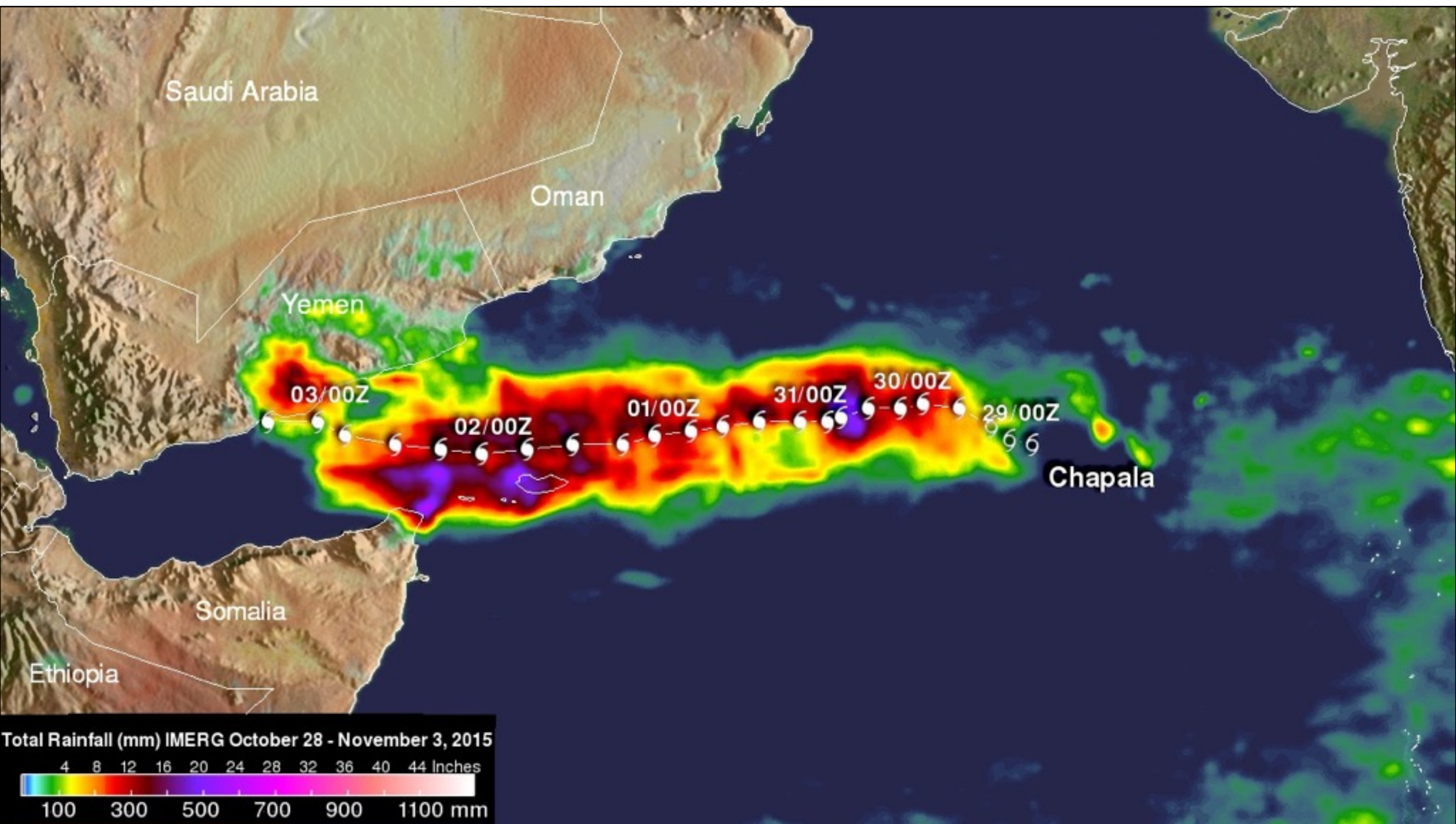
Unusually warm waters in the Arabian Sea during September 2015

Tropical cyclone Chapala intensified rapidly over the warmest waters ever observed for this time of year in the Arabian Sea. This phenomenon could be an example of the effect of climate change on weather that may impact Desert Locust. (source: NOAA)



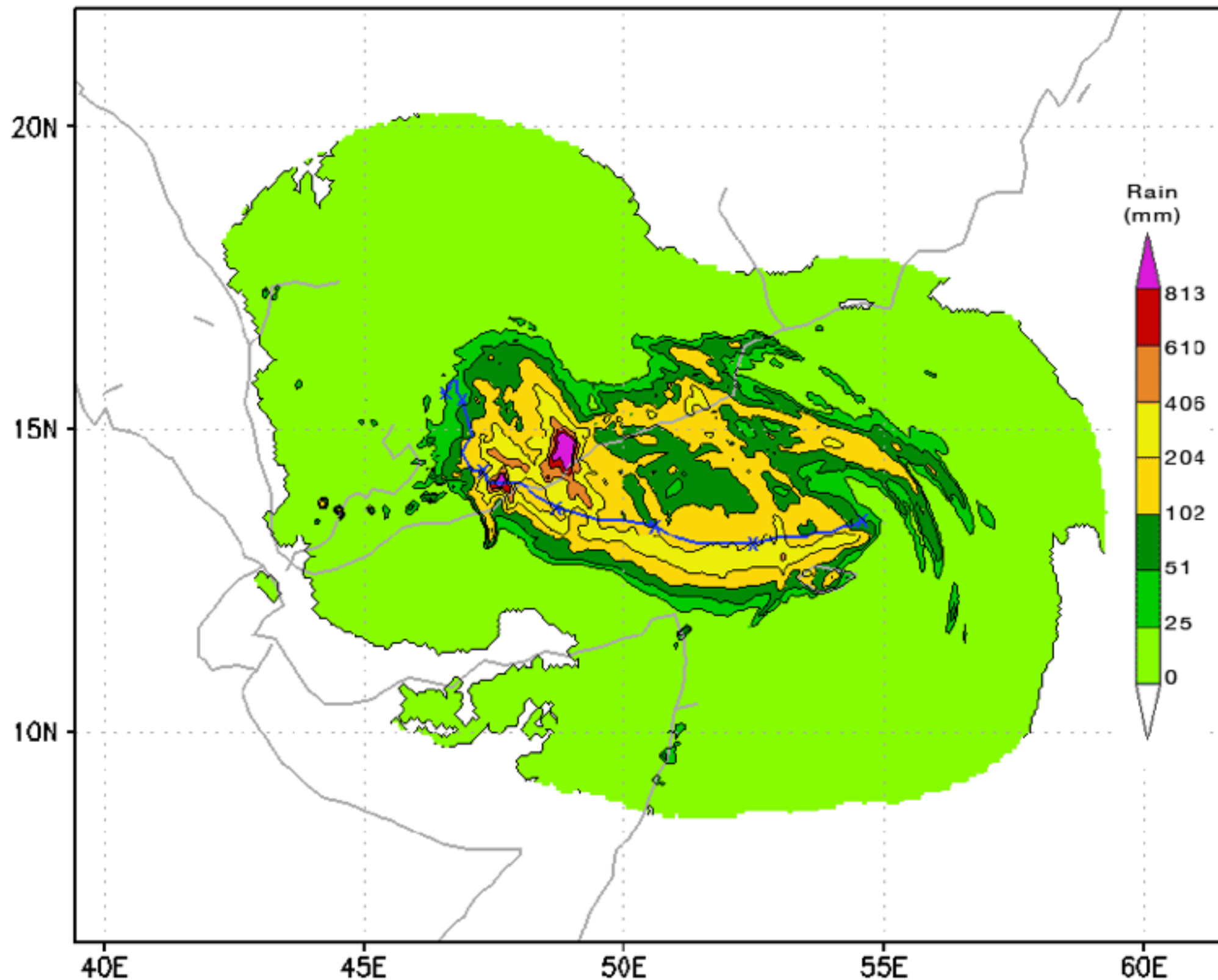
Tropical cyclone Chapala - track forecast (2 November 2015, 0900h GMT)

Tropical cyclone Chapala is expected to make landfall on the southern coast of Yemen near Mukalla at about 6AM on Tuesday morning, 3 November. Dry desert air may weaken Chapala and it may make landfall as a weaker tropical storm. Nevertheless, it may still be a formidable cyclone of at least Category 1, which is an extremely rare event for Yemen. After making landfall, it will move towards the northwest and will decay and weaken further due to interaction with the rugged and dry terrain. *(source: JTWC)*



Tropical cyclone Chapala - rainfall estimates (28 October - 3 November 2015)

The Integrated Multi-satellite retrievals for GPM (IMERG) is used to make estimates of precipitation from a combination of passive microwave sensors and geostationary infrared (IR) data. The IMERG rainfall estimates for tropical cyclone Chapala for 28 October 2015 (1800 GMT) to 3 November 2015 (0830 GMT). (*source: NASA/GSFC*)



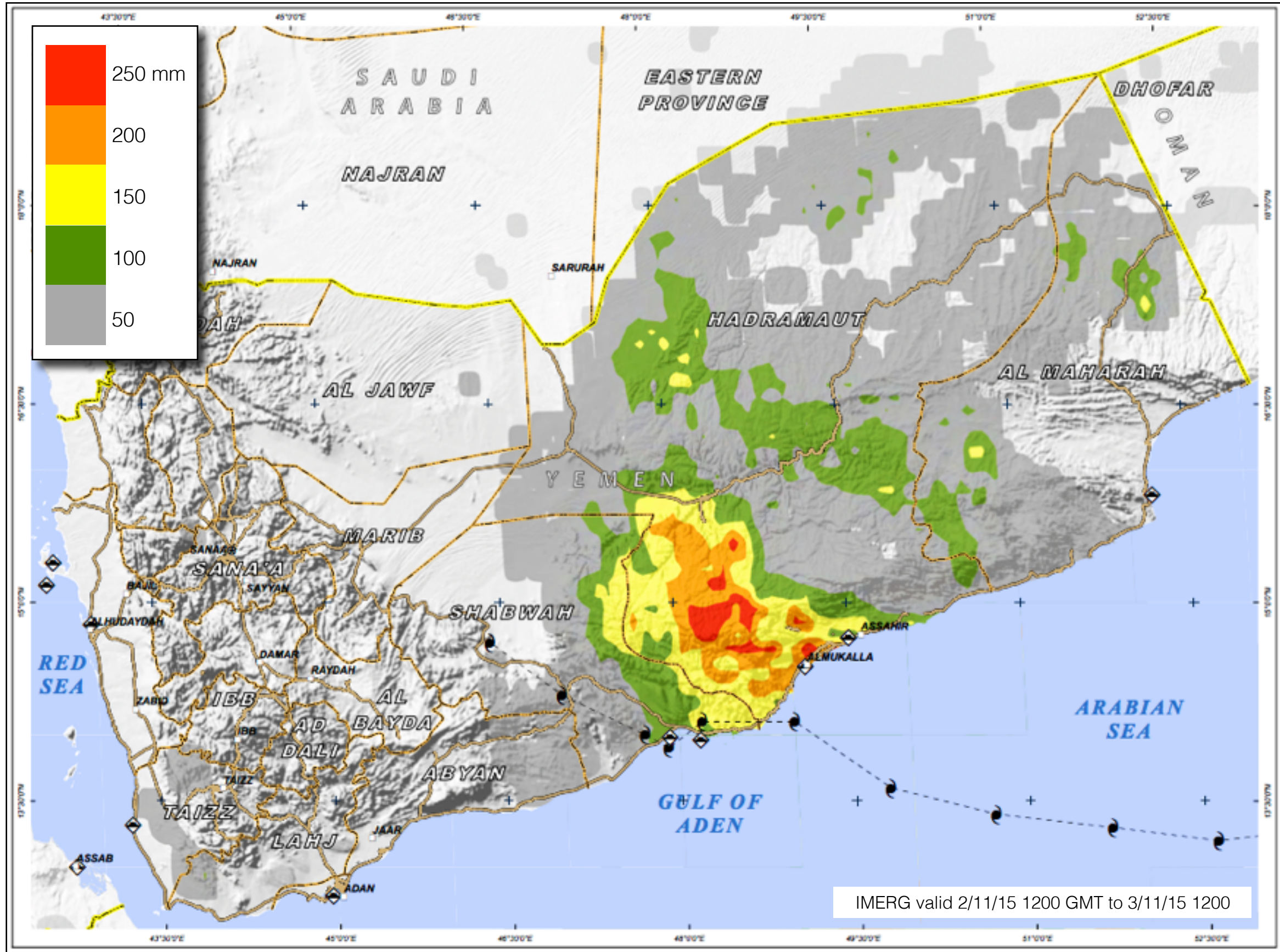
Tropical cyclone Chapala - heavy rainfall expected in Yemen

Normally, less than 50 mm of rain fall along the southern coast of Yemen in a year. As Chapala encounters steep mountains near the coast, heavy rains may dump up to several years' worth of rain in 2-3 days, leading to serious flooding. The rainfall forecast issued on 1 November indicates far above-normal rainfall amounts on 2-4 November. After making landfall, Chapala is expected to continue to move NW but will weaken and decay due to dry air from the interior desert. (*source: HWRF model, NOAA/EMC valid to 4/11/15 21h GMT*)



Tropical cyclone Chapala - track forecast (3 November 2015, 1500h GMT)

Tropical cyclone Chapala generated gusts of up to 167 km/h as it briefly landed on the southern coast of Yemen near Mukalla at about 06 GMT on Tuesday morning, 3 November, before tracking back into the Gulf of Aden. Damage was reported in Mukulla. Several hours later, Chapala hit the Yemeni coast again west of Balhaf and was moving west-northwestwards over the interior. It was expected to rapidly decay during the next 24 hours due to interaction with the rugged and dry terrain of Yemen's central highlands. (source: JTWC)



Tropical cyclone Chapala - estimated precipitation (2-3 November 2015)

Based on rainfall estimates, several years worth of rain probably fell during two days along the southern coast of Yemen near Mukallah and in the interior governorates of Shabwah and Hadramaut. Thereafter, the cyclone decayed and dissipated as it moved inland towards Shabwah and Marib. (source: OCHA/UNOSAT/UNITAR)



Hasek area on the coast of southern Oman near Salalah (1-2 November 2015)



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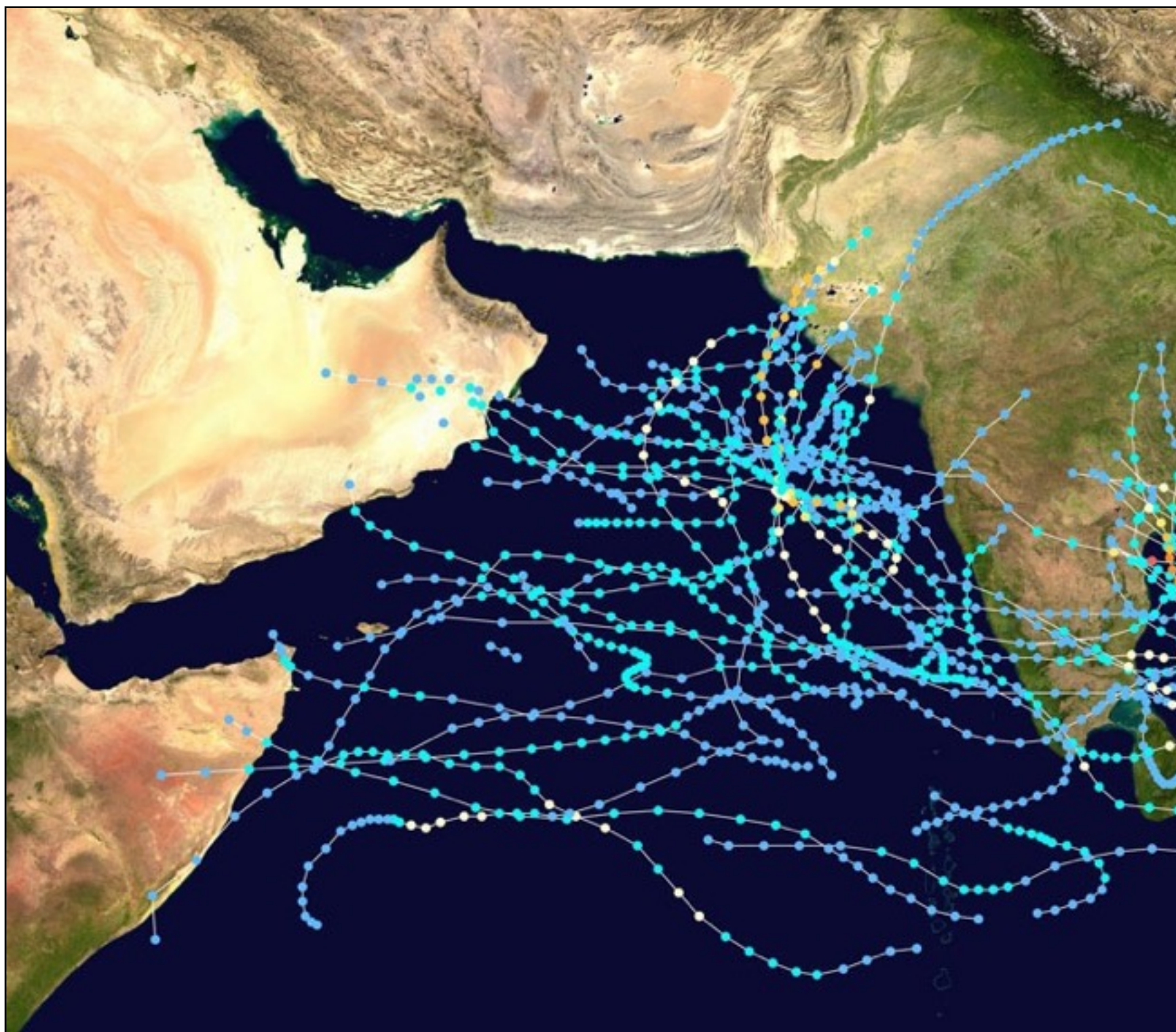
Socotra Island, Yemen (2 November 2015)



Mukallah, Yemen (2-3 November 2015)

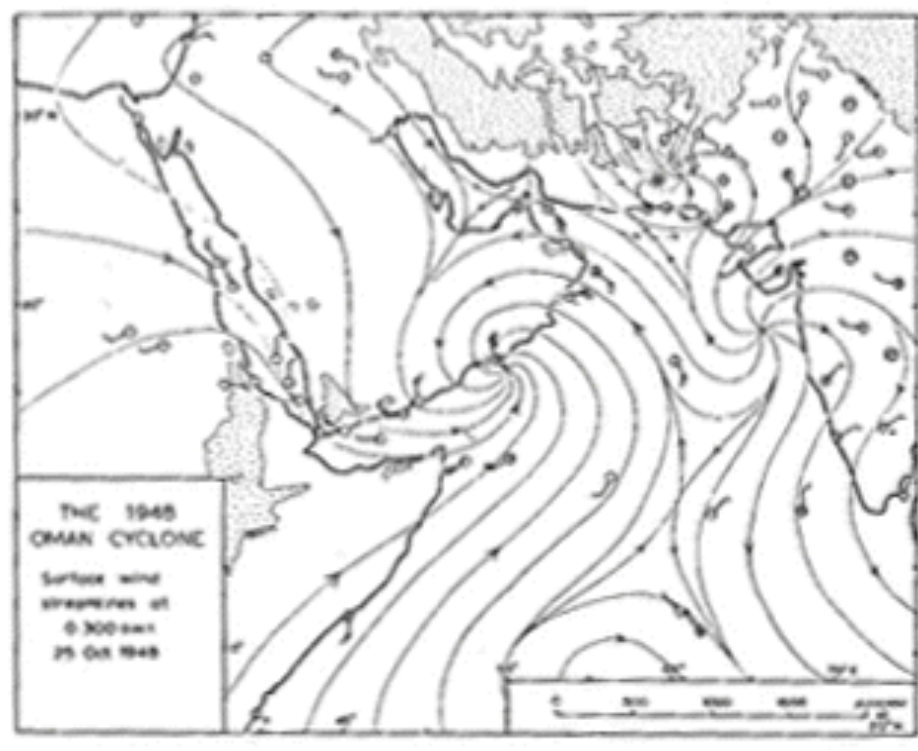


Mukullah area, Yemen (2-3 November 2015)

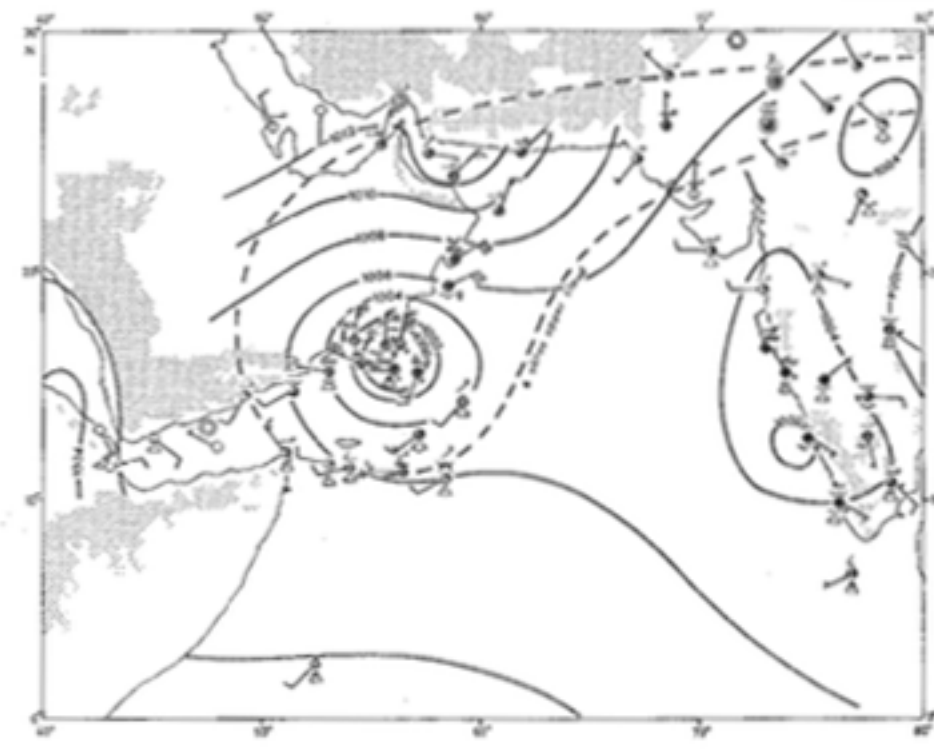


Tropical cyclone tracks over the Arabian Sea, 1980-2005

Historically, there have only been six major Category 3 or stronger tropical cyclones over the Arabian Sea, of which two were Category 4 and 5 (Gonu, 2007 and Phet, 2010). Tropical cyclones are rare in this region because the Arabian Sea is small, the tropical cyclone seasons (May to early June, and late October to November) are relatively short due the Southwest Monsoon, and large amounts of dry air are present over the Arabian Peninsula. Cyclones rarely make landfall on the Arabian Peninsula and, when they do, it is usually in Oman. Storms have reached the Yemen coast in 1960 and 1961. In 2008, Tropical Depression Three killed 90 people and caused \$400 million in damage, making it the second worst natural disaster in Yemen's history behind the 13 June 1996 floods.



Oct 1948



Nov 1966

The historical impact of tropical cyclones on Desert Locust

Tropical cyclones generally occur over the Arabian Sea during two periods, May-June and October-November, that are synchronous with the changeover of the Southwest Monsoon. They normally form in the southeast Arabian Sea and move WNW. Historically, about one in three cyclones move into the western Arabia Sea, approaching the Arabian Peninsula. In the past, tropical cyclones on at least two occasions led to the development of a Desert Locust plague. In October 1948, a cyclone made landfall in northeast Oman and brought heavy rains (156 mm, Salalah) that was followed by further heavy rains in December and March 1949 over southeastern Arabia, leading to breeding in northern Oman during the winter of 1948/49 and swarms in spring 1949, causing a plague to develop by October. In November 1966, a cyclone landed in southern Oman and brought heavy rains (203 mm, Salalah). The cyclone moved to eastern Yemen, followed by further rains in spring and summer of 1967, allowing spring breeding that led to the development of the 1967-68 plague upsurge.