

27 October 2023

Event Report: Hurricane Otis

On October 25, at 1:25 local time, East Pacific hurricane Otis made landfall in the Mexican state of Guerrero, near Acapulco de Juárez, as a Category 5 storm, the highest level on the Saffir-Simpson Scale. After landfall, the system quickly weakened over Mexico's mountainous terrain and subsequently dissipated.

Several factors make Otis a noteworthy event. The storm was the first hurricane in recorded history to hit land in the eastern North Pacific with category 5 strength. In general, systems that make landfall with this strength are statistically rare. Therefore, there is only one earlier example of a cat 5 storm that had a town with over a million inhabitants in its path: Hurricane Andrew, which swept over the southern parts of Miami in 1992. Of particular note about Otis, however, was the meteorological development of the storm. With an exceptionally fast increase in strength, Otis set a record and is an extreme example of the effect of rapid intensification.

The portfolios of the Solidum ILS Funds have limited exposure to hurricane risk in Mexico. For all three Solidum ILS funds, the Solidum Cat Bond Fund and the two SAC 2 and SAC 3 funds of the Solidum Event Linked Securities Fund, Otis is expected to negatively influence the October results by approximately 0.25% each.

Meteorological Development

Otis evolved from a thunderstorm area in the Pacific south of Guatemala that was classified as a tropical depression on October 22 and reached tropical storm strength six hours later. On the morning (6 UTC) of October 24, Otis had a central pressure of 1000 mbar and constant wind speeds of 85 km/h, according to data from the American Hurricane Observatory NOAA. At this point, the prediction was that Otis would gradually become stronger and hit land with "near hurricane strength". Over the next 9 hours, Otis followed this forecast, with a slight increase in the predicted intensity of landfall to "hurricane strength". After that, however, the system strengthened at an unprecedented speed. Over the next 13 hours, Otis exploded from a tropical storm at 110 km/h into a Cat 5 hurricane at 270 km/h. The central pressure dropped by 70 mbar to 923 mbar over this period.



The path of hurricane Otis and its development from a tropical storm (turquoise) to a Cat 5 hurricane (violet); Credit: Wikipedia

Hence, in addition to these meteorologically impressive marks, the *forecast error* for the intensity of the storm constitutes a record as well. This is particularly noteworthy because NOAA's newest generation of forecasting models provided impressively accurate forecasts for other storms with rapid intensification, such as Hurricane Idalia in the Gulf of Mexico in August this year.

This discrepancy motivates a final comment: the strength of hurricanes is often estimated using indirect analysis methods. The Dvorak technique, for example, uses satellite images taken in the visible and infrared spectral range to determine the physical parameters from typical structural patterns of cyclones. The last direct measurements of Hurricane Otis took place 11 and 10 hours before landfall, when a NOAA Hurricane Hunter Lockheed WP-3D Orion flew through the eye of the storm twice. The mission revealed that the storm was already significantly stronger than estimated at the time. Thus, the first phase of the rapid development may have started a little earlier than the NOAA data points indicate, which would reduce the rate of increase. In the absence of ground-based radar stations in the region, which could have provided additional information using Doppler effect measurements, all subsequent intensities were then again based on the phenomenological Dvorak patterns. The fact that this phenomenological analogy method then yielded extreme results may suggest that the Dvorak technique had been pushed to its limits with Otis. It is expected that extensive follow-up studies will take place, and the comparison of the final best-track data with the values from the forecast reports will be interesting.

Reliable information regarding the insured loss caused by Otis is not yet available. Initial documentation in official and social media show significant impacts on buildings and infrastructure. Therefore, it can be assumed that Otis is a relevant insurance event for Mexico. However, given the limited total amount of insured assets and the relatively low insurance density in the retail sector in Mexico, the total insured loss is unlikely to far exceed USD 5 billion.

The Portfolio Management Team remains at your disposal for further questions.

With kind regards

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