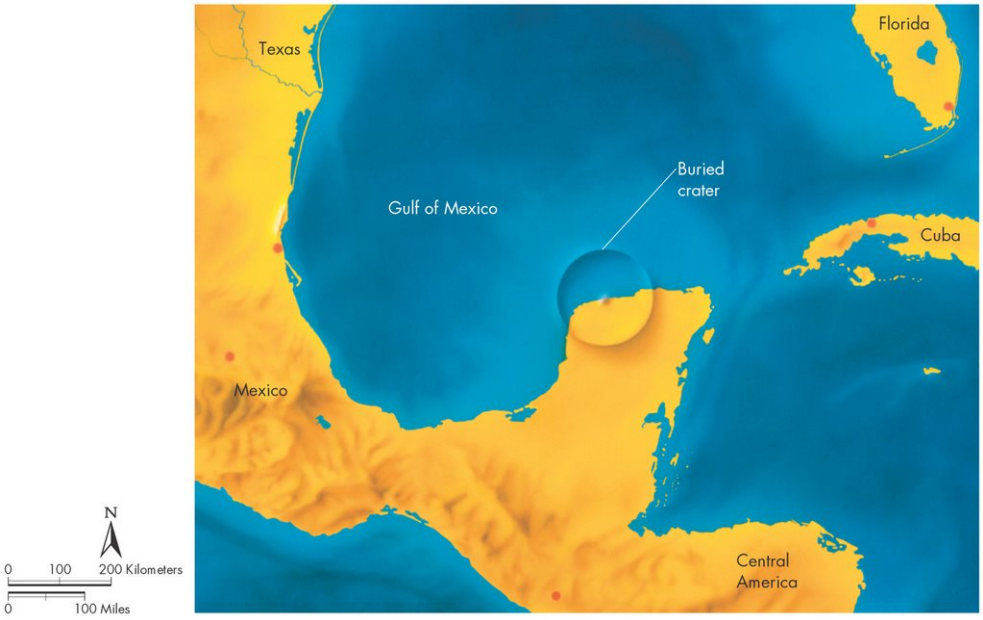
GOMECC-3 weekly summary report. Week 4
Sampling in the crater of the meteorite that killed the dinosaurs

Ahoy land dwellers!
As we type these lines we are completing our last set of stations in Mexican waters, the line in the Yucatan channel, through which water enters the Gulf of Mexico. We have about 30 stations left overall, so it is going to be a busy week.

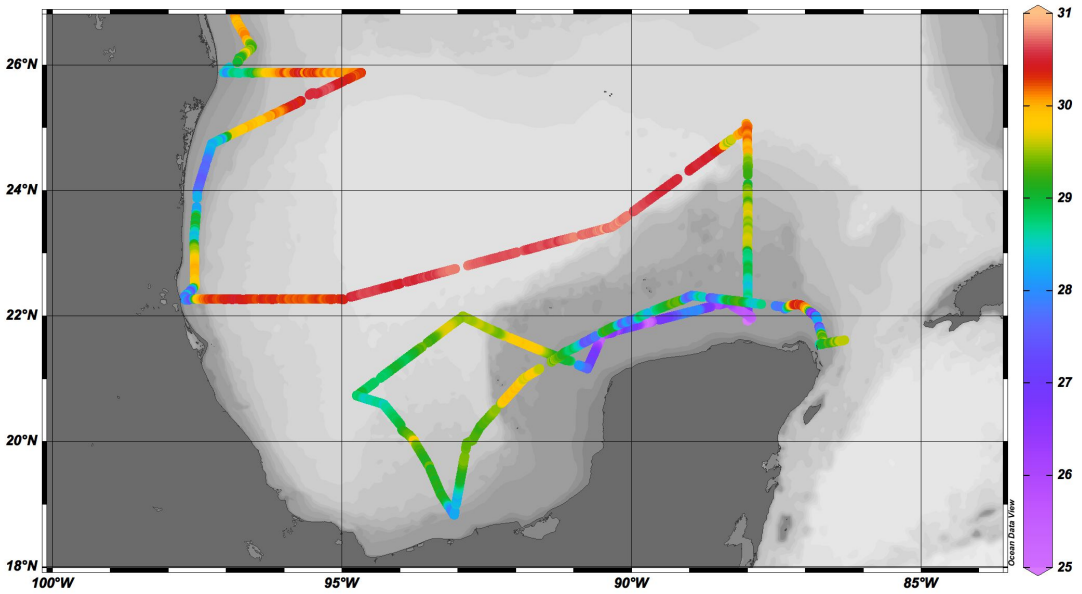
Have you ever heard the name "Chicxulub" before? Chances are, unless you are from Mexico or a geologist, you, like a lot of us on board, have not heard the name before (or know how to pronounce it!). The Chixculub crater (pronounced Sheek-shoo-loob), was formed as a result of the impact of an asteroid, 66 million years ago, in the Yucatán peninsula. The crater extends into the ocean, in the area we have been working on (see map below). It is believed that this asteroid impact triggered the Cretaceous-Paleogene extinction event that caused 75% of Earth's plants and animals to become extinct, including the dinosaurs. Talk about working in places of historic relevance!



Location of the impact crater in the Yucatan peninsula.

As we have already mentioned, we have spent this past week in the Yucatan-Campeche area, and looking at our underway pCO2 area, it seems like we have captured some before-and-after hurricane Franklin data, so it'll be very exciting to look at the data in more detail!
For now, take a peek at our surface temperature values before and after the passing of hurricane Franklin. Coastal waters are always more dynamic, so focusing in deep waters, there was a significant drop in surface water temperature of about 2

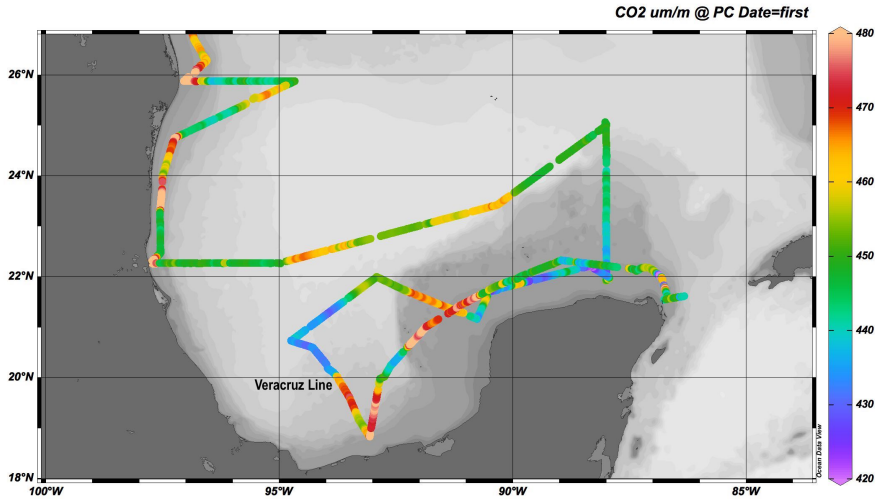
degrees comparing the before data (the line heading east from slightly above 22N, when we were steaming to get out of the way of the storm) and after (the diamond shaped transect in the Bay of Campeche that we did after the storm passed).



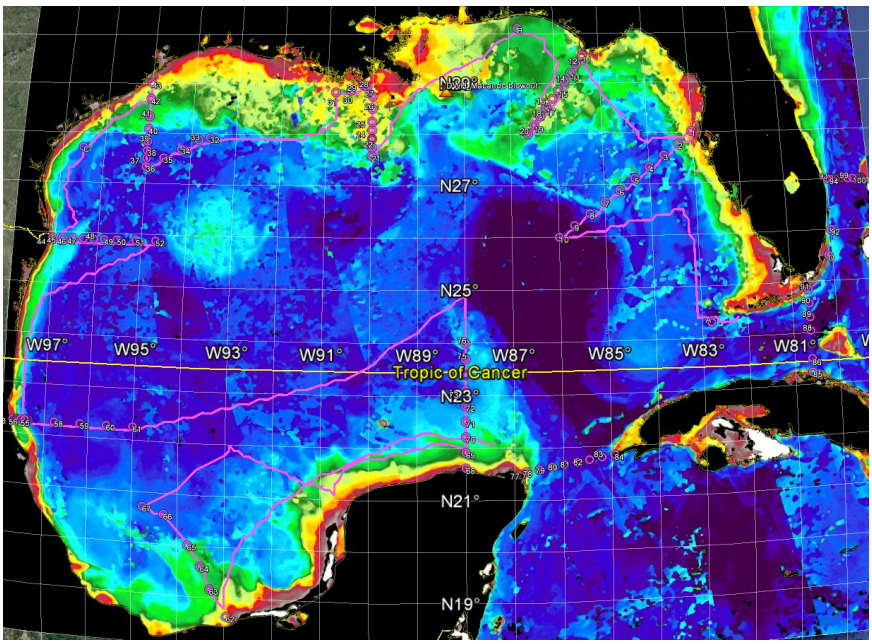
Sea surface temperature recorded with the ship's SBE45 temperature sensor.

We have not had the chance to process all our underway pCO_2 data yet, but we have access to the raw data (as xCO_2). pCO_2, the partial pressure of carbon dioxide is, in layman's terms, a way to measure how much CO_2 is dissolved in the water. It is one of four parameters that determine the CO_2 system in the ocean (the other three being pH, dissolved inorganic carbon and alkalinity). While xCO_2 values should be looked at with caution, we can get an idea of general trends and assume that the final data will show somewhat similar increases and decreases.
In our raw xCO_2 (which are not corrected to in-situ temperature yet) we also see a significant drop of about 30 units (before-and-after Franklin), although pCO_2 is affected by multiple factors and thus our data shows a more complex picture.

There is a very interesting transition in xCO_2 in the line that we have tentatively named Veracruz line, where xCO_2 values drop quickly starting at approximately 20N. Alkalinity values in the near-shore stations where also lower than expected (data not shown). This transition is also observed in preliminary composite color satellite images that used several days of MODIS images from last week. Circulation models show that there is a persistent cyclonic gyre in this area and we think we might have been able to capture it with our samples. We are very much looking forward to working on this when all the data are compiled.



Surface xCO_2 data collected with our underway pCO_2 system



Crude color composite image using several days of MODIS data. Image courtesy of land-based participant David English

We are all ready to get back to land next Monday but still full of energy and ready to deal with all of our remaining stations.

Don't forget to check out our blog for a lot more details about what we're doing on this cruise: https://gomecc3.wordpress.com/

Onwards!
Leticia and Denis,
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