COAPS SPECIAL SEMINAR

Ocean Predictability

Ocean prediction is a relatively new science when compared to numerical weather prediction having its roots in the seminal work by Richardson (1922). While the two problems share common approaches implementing numerical representations of the physical conservation laws and using arrays of satellite and in situ observations to make regular corrections, the processes of highest interest differ widely in spatial and temporal scales, and the observation capabilities differ dramatically. These drive many different considerations in the spatial and temporal scales at which predictions have skill.

We examine large surface drifter deployment experiments to understand how we can control the application of observation corrections in the ocean prediction systems through the data assimilation component. We see a separation in prediction skill at about 220 km wavelength with skillful prediction at larger scales and a lack of skill at smaller. This situation has developed in the last decade resulting from computer capability advancement outpacing the regular ocean observation resolution. Embedded within the relatively coarse regular ocean observations are higher resolution data from research efforts such as the Sub-Mesoscale Ocean Dynamics Experiment (S-MODE). Such data sets allow us to test the concepts, and exploiting the high-resolution observations leads to local prediction skill at smaller scales. The SWOT satellite observations fall into the category of spatially local high-resolution data that is not available every day. Exploiting the regularly changing SWOT resolution leads to increased forecast skill.

The concepts also extend to vertical resolution. Satellite altimeters provide information primarily on low vertical mode structures, and profiling gliders or ARGO floats provide relatively high-resolution observations. When used simultaneously, if we exploit one of these data sets well, we lose information from the complementary data set. Rather than using the observing systems together, we consider the implications of a multiscale analysis approach, as has been used to address horizontally localized high-resolution data. By separating the data sets based on vertical resolution, we show that a sequential analysis can properly utilize the different observation characteristics.

Dr. Gregg Jacobs

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Time: **2:30 PM, Tuesday, March 31, 2026**

Location: **In person: 255 Research A (COAPS)**

Virtual: **https://fsu.zoom.us/j/92268262553**