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The Fascinating and Complex Geology and Hydrodynamics of Yellowstone Lake

At an altitude of 2357 m and with a surface area of $\sim 341 \text{ km}^2$, Yellowstone Lake is a large alpine lake that inspires millions of people each year with its serene mountain views, early morning mists, and sublime sunsets. It also straddles the southeastern boundary of the 640 ka Yellowstone caldera, and the intra-caldera portion of the lake hosts numerous hydrothermal fields, contains the world's largest collection of hydrothermal explosion craters, and was the site of one of the largest documented earthquake swarms on the Yellowstone Plateau (2008-2009 Lake Hotel Swarm). In 2016, the NSF-funded Hydrothermal Dynamics of Yellowstone Lake (www.hdylake.org) project began a 3-year field program aimed at understanding the cause-and-effect relationships between all these dynamic processes (magmatic, tectonic, climatic, and hydrothermal) in the lake. The fieldwork, which included a network of monitoring instrumentation on the lake floor and a sediment coring program, has provided a rich and complex interdisciplinary set of data that is presently undergoing analyses in a variety of labs across the country. In this talk I will provide an overview of the HD-YLAKE project, describe some preliminary results, and try to make some sense of the incredibly dynamic environment that is Yellowstone Lake.