South of Japan, the Kuroshio Current sometimes takes a large meander (LM) path. This phenomenon is unique among western-boundary currents. The key question for the Kuroshio system kinematics—how water properties change during LM formation and decay—was studied using an LM index computed from a historical hydrographic dataset to systematize the common features accompanying LM formation. The analysis revealed that changes in the position of the Kuroshio front were coherent to very deep levels. The figure shows that deep isopycnals are lifted up almost 500 m in the center of the LM and that the interior of the deep part of LM is filled with warm Kuroshio water. Together with other findings, this suggests that the upper Kuroshio path is controlled by variations in the deep circulation interacting with the complex bottom topography. Because direct velocity measurements of the LM interior are unavailable, altimetry data from the Geosat Geodetic and Exact Repeat Missions will now be used along with the hydrographic data to study anomalies in the deep geostrophic velocities and to determine the full energy and vorticity balances. Future studies will look at how interannual and decadal processes in the North Pacific, pre-condition, trigger, or modulate meander formation.