2016 OCEAN SCIENCES MEETING
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# A54B-2713: Near-inertial resonance, upper-ocean stirring and impacts on the Kuroshio path due to typhoons in the northwestern Pacific Ocean

ABSTRACT

**Friday, February 26, 2016**
**04:00 PM - 06:00 PM**
*Ernest N. Morial Convention Center - Poster Hall*

Typhoons alter the upper ocean dynamics and thermal structure, giving rise to feedback on the atmosphere. For rigorous oceanic modeling under typhoon conditions, we implement the inverse barometer effect and the COAMPS bulk formula into ROMS (Shchepetkin and McWilliams, 2005). A submesoscale eddy-resolving oceanic modeling is configured at a horizontal resolution of 2 km based on the JCOPE2-ROMS downscaling system forced by the JMA GPV-MSM atmospheric reanalysis. A retrospective, synoptic reanalysis is carried out with a particular focus on the two consecutive super typhoons Phanfone (#1418, Category 4, the lowest pressure was 935 hPa) and Vongfong (#1419, Cat. 5, 900 hPa) in the fall 2014. The model successfully reproduces increased eddy kinetic energy below the typhoons with intense cyclonic positive vorticity driven by torque of the wind stress curl, not only at surface but also at depth down to 100 m deep. These cyclones are cold-core mesoscale eddies with SST decrease by about 3$^{o}$C associated with prominent mixed layer deepening. A distinct peak appears at around the inertial frequency in rotary spectra of the clockwise velocity component, suggesting that near-inertial gravity waves are generated below the typhoon track. Inertial resonance evidently occurs on the right side of the typhoon with intensified vertical mixing and associated mixed-layer deepening. On the Pacific side of Japan off Shikoku Island, the Kuroshio main body oscillates horizontally and vertically upon collisions with near-inertial gravity waves in the mixed layer, followed by substantial alteration of the Kuroshio path in the downstream region. Velocity rotary spectra extract asymmetric responses in frequency and rotating direction. Whereas topographically controlled cyclonic eddies with the peak frequency of about 3 days are apparent in the inshore side of the Kuroshio path, the near–inertial clockwise fluctuations dominates in the offshore side.

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