

# Mechanisms of Cyclone Induced Subsurface High Salinity Intrusion in the Northern Arabian Sea

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Moored observations in the Northern Arabian Sea (NAS) during summer 2007 showed substantial velocity, temperature and dissolved oxygen fluctuations, accompanied by episodic high salinity intrusions with maximum values greater than 37.4 on time scales of a couple of days to 2 weeks after the passage of Cyclone Gonu. These events are characterized by a rapid increase in temperature, salinity and dissolved oxygen followed by an abrupt decline. The mechanisms behind these high salinity intrusions are investigated with measurements from Array for Real-Time Geostrophic Oceanography (ARGO) free-drifting profiling floats in northern Arabian Sea. ARGO profiles near mooring locations showed significant temperature and salinity increases in the subsurface followed the Gonu passage with temperature increases of 2 to 3 °C and salinity increases of 1 to 2, which is consistent with the mooring measurements. Further investigation shows that ARGO profiles with measured salinity greater than 37.4 in NAS were rare during the five years before Gonu. However, within 6 months after Gonu, profiles with observed high salinity (> 37.4) in the subsurface were more common and distributed mainly in the Oman Sea off the northern Oman coast. The possible source of high salinity water is the Persian/Arabian Gulf outflow along the Oman coastline. This is confirmed by the simultaneous measurements from a moored cabled current meter array at the northern Omani coast, which showed a direction change from onshore to offshore after Gonu that lasted for 2 weeks. The cabled array, installed by Lighthouse R&D Enterprises, has been reporting continuously since 2005. The offshore advection is hypothesized to transport a large amount of relatively high salinity water into the Oman Sea during the current reversal.

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