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# Observations of Large Amplitude Non-Linear Internal Waves in the South China Sea

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Two hundred meters long drifting chains that acquire profiles of temperature and three dimensional velocity were designed and built by us at SIO to investigate the dynamics of large amplitude non-linear internal waves in the ocean. These waves have amplitudes in excess of 100 m, can reach depths in excess of 1000 m, are organized in packets with two or three waves and can propagate for 100's of km. A cross-shaped array of eight instruments was deployed in the South China Sea (near Dong-Sha Island) in Spring '07 for about 10 days around spring tide. The spacing between the instruments ranged between 1.5 and 15 nautical miles. The deployments were preceded by the release of 10 SVP drifters to investigate the intensity of 15 m depth currents in a range of possible deployment areas. From the analysis of the temperature profiles we found that changes in the structure of the wave packets can occur over very short distances. The accurate GPS positions of the drifting devices were exploited to use the array as an antenna. Points of equal phase of the waves were identified from vertical profiles of temperature and from the speed of the devices. Preliminary results show that the speed of the waves can be computed with great accuracy, which implies that the nonlinear terms of the flow can also be computed. The phase speed computed for the leading wave of a packet observed on May 3 ranges between 2.75 m/s and 2.81 m/s and is nearly identical to the speed of the first mode baroclinic semidiurnal tide computed from the CTD profiles taken during the experiment.