# Measuring Waves in Makassar Strait

Fugro GEOS has successfully completed an oceanographic programme measuring surface and internal waves in the Makassar Strait, offshore East Kalimantan, Indonesia for the Total E&P Indonesia-Donggala project. The measurements were made using a single oceanographic mooring deployed in about 1,900m of water and serviced on a regular two-monthly basis over the ten-month period of the programme.

The mooring had nineteen instruments configured to measure currents, waves, tidal elevations and seawater properties throughout the water column. The instruments consisted of ADCPs (acoustic Doppler current profilers), conventional rotor current meters, temperature sensors and a water level recorder. An important aspect of the programme was to determine whether solitons - non-linear waves - were present. So to catch the rapid fluctuations in temperature and water currents expected, instruments covering the top 700m of the water column were set to record more rapidly than those below 700m. The mooring also included the first application of an RDI Workhorse with Waves ADCP on a flexible deepwater mooring. The depth of this below the surface was critical to the ability of the instrument to measure directional wave data. Percentage data returns from the deployed instruments were better than 90 per cent data return from the current meters and 96 per cent for the wave data over the deployment period.

Data from the Workhorse with Waves ADCP was reassuring, showing a generally benign wave climate with the distinct seasonal trends associated with the tropical monsoons, and the short wave periods expected in a fetch-limited sea.

The comprehensive set of current velocity data collected was the subject of specially developed analysis routines and provided clear evidence that deepwater solitons impacted the location during the survey. These solitons caused significant short-term increases in currents throughout the water column, most dramatically in the upper portion. This was confirmed by the temperature data, essential for a complete interpretation of the soliton signature, that showed the individual solitons were associated with downward isotherm displacements of about 50m.