Deep-Tow Investigations of 'Tiny Wiggles' in the Western Pacific Jurassic "Quiet Zone"

William W. Sager Department of Oceanography, Texas A&M University, College Station, TX 77843; ph. 979-845-9828; fax 979-845-6331, wsager@ocean.tamu.edu; Maurice Tivey, Department of Geology & Geophysics, Woods Hole Oceanographic Institution, Woods Hole, MA02543; ph. 508-289-2265, fax 508-457-2023, mtivey@whoi.edu

The Jurassic "Quiet Zone" of the western Pacific is a region in which seafloor-spreading magnetic anomalies become progressively more subdued with increasing age, to the point that it is extremely difficult to correlate pre-M29 anomalies from sea surface data. It has been postulated that this trend indicates that the Jurassic magnetic field strength was significantly weaker than later, during the Cretaceous. In 1992, we investigated this phenomenon by collecting two long deep-tow magnetic profiles, extending ~600 km over seafloor older than M29, estimated to be as much as ~9 Ma older than this anomaly (Sager et al., JGR, 103, p. 4269, 1998). With the anomaly amplitudes increased by having the sensor nearer the magnetic source layer, it was possible to correlate many of the anomalies between the two tracks. All of the anomalies previously mapped via aircraft by Handschumacher et al. (Tectonophysics, 155, p. 365, 1988) were recognized, in addition to a number of older anomalies. Uncertainties for the deep-tow study were ambiguities arising from interpreting some anomalies that did not match from one profile to the other, and the fact that the profiles showed both large and small amplitude anomalies. The smallest anomalies ("tiny wiggles") have 50-75 nT amplitudes with wavelengths of a few km and are superimposed on larger fluctuations, with amplitudes of 100-200 nT and wavelengths of >50 km. Depending on whether the tiniest wiggles or the larger anomalies were modeled as field reversals, the resulting time scale differed in the number of pre-M29 reversals by a factor of two. Both models indicate rapid reversal rates in late Jurassic time with implications for unusual magnetic field behavior during the Jurassic. Although it was impossible to tell which magnetic model was best, we felt that the more conservative interpretation (fewer anomalies) was best and that the tiny wiggles probably resulted from paleofield intensity fluctuations, rather than reversals. Nevertheless, the possibility of extraordinary field behavior recorded in seafloor magnetic anomalies has made it possible to collect additional deep-tow

1. Chapman Conference on Timescales of the Geomagnetic Field 2. Contributed 3. (a) W. W. Sager Department of Oceanography, Texas A&M University, College Station, TX 77843-3146, (b) 979-845-9828 (c) 979-845-6331 (d) wsager@ocean.tamu.edu 4. No

data. During December 2002 and January 2003, we will collect new deep-tow lines to extend the prior lines past ODP Site 801 (where unusual magnetic behavior has been deduced from cored basalts), we will duplicate some of the previous lines to check anomaly correlations, and we will conduct small, dense surveys over Site 801 and another spot in the lineation sequence to investigate anomaly coherence and structure.