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Inclination shallowing recorded in some deep sea sediments

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We have analyzed the cleaned magnetic directions of high resolution, stable and intense deep sea sediments of DSDP Leg 86 from the Northwest Pacific Ocean, both as a function of subbottom depth and time. At Site 576 (32°21'N, 164°17'E) the top 25 m were deposited during the last ~5 Ma and have a magnetic signal with resolution of 1000-5000 years/cm. At Site 578 (33°56'N, 151°38'E) the upper 120 m represent the past ~6 Ma with resolution of 250-1000 years/cm. The sediments at these Sites are composed mainly of pelagic red clay, dominated by terrigenous components and a very small contribution of volcanic ash.

The inclinations were analyzed using the Briden-Ward/Kono method. For both Sites 576 and 578 no significant differences were observed between normal and reversed polarity samples of the average inclination, intensity and angular dispersion. At Site 578 there is a systematic shallowing of inclinations with both depth and time of ~1.1°/Ma which exceeds the northward transport of the Pacific plate of ~0.3°/Ma. At Site 576 we see a shallowing of ~0.3°/Ma.

Our results show that :

- 1) the top 25 m of neither Site 576 (~5 Ma) nor Site 578 (~0.7 Ma) have significant inclination shallowing;
- 2) the water content of Site 576 are generally somewhat higher than for Site 578;
- 3) the water content is nearly a constant in the top 25 m at Site 576, but there is a downcore decrease in water content in Site 578, which correlates with the inclination shallowing.

Therefore the data seem to indicate that part of the downcore inclination shallowing at Site 578 is associated with compression and dewatering of the sediment.