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The cosmic native iron in Upper Jurassic to Miocene deep-sea deposits of the western North Atlantic

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Thermomagnetic analysis of 335 rock samples from DSDP sites 386, 387 (Leg 43) and 391 A, C (Leg 44) drilled in the western North Atlantic revealed distribution patterns of native Fe particles in Upper Jurassic to Miocene deep-sea deposits. Native iron occurs in deep-sea rocks as individual particles from tens of nm to 100 μm in size. The native Fe is identified throughout the sections recovered. Its concentration ranges from nx10-6% to 5x10-3%, but zero values persist to occur in each lithostratigraphic unit studied. The bimodal distribution of the native iron concentration with a zero mode is typical for the cosmic dust in sedimentary rocks, because of its slow flux to the Earth surface, as compared to sedimentation fluxes. Ni admixture in native Fe also demonstrates bimodal distribution with the zero mode (pure Fe) and a mode 5 – 6% that corresponds to average Ni content in the cosmic dust and meteorites. Concentration of native Fe does not depend on rock types and geological age. Relatively high mean native Fe concentrations (less zero values) occur in Lower Cretaceous laminated limestones (sites 387, 391) interpreted as contourites and in Oligocene volcaniclastic turbidites of the Bermuda Rise foot (Site 386), whereas minimum values are measured in Miocene mass flow deposits (Site 391). We suggest that concentration of native Fe increases in deposits of pulsating sedimentation (turbidites, laminated contourites) due to numerous short hiatuses and slow sedimentation events in between instantaneous turbidite or contourite deposition pulses. Extreme values possibly indicate cosmic dust flux anomalies.
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