

Compilation of marine trackline magnetic data of the World

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The first version of the World Digital Magnetic Anomaly Map (WDMAM) was published at the IUGG 2007 meeting in Perugia, and its second version is now planned to include more aeromagnetic and marine data sets. In order to contribute to the second version of WDMAM, we compiled approximately 20 million records of the GEODAS global marine trackline data available from the U. S. National Geophysical Data Center. They were collected in about 2400 cruises in a time span from 1960 to 2002. We recalculated magnetic anomalies using a comprehensive main and external field model CM4, which reduced most of misfits in the original anomaly data. We then carefully checked trackline profile by profile of all cruises, and cleaned them by removing spikes and other spurious data, or adding them constant values if applicable, and/or reducing noise level by low-pass filtering. Some offsets still remained in the recalculated and cleaned data set. We apply a line leveling method to further reduce these offsets. In this method, for each anomaly data point along a trackline, we calculate its averaged difference from all the other trackline data within a certain radius, apply low-pass filtering to these differences along each trackline, and make anomaly correction by the averaged and filtered difference. The average of differences is calculated with weights proportional to the -4th power of the distances from the point. A few iterative applications of this method are carried out in actual line leveling. Preliminary results of line leveling with data in the North Atlantic area showed that the rms cross-over error of anomalies reduced from 61 nT to 45 nT, and noticeable spurious anomalies along tracks diminished from the map created by the leveled data set. The results of line leveling with the cleaned GEODAS data set will be presented.