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Compilation of marine trackline data of the World II - line leveling of the cleaned GEODAS data set

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One of the important problems in producing the World Digital Magnetic Anomaly Map (WDMAM) is processing of data in oceanic areas, which cover 70% of the earth. As the source of oceanic data, we used the GEODAS marine trackline data set available from the U. S. National Geophysical Data Center. We recalculate magnetic anomalies using a comprehensive main and external field model CM4, and cleaned the recalculated anomalies by careful check and removal of spurious data. Original GEODAS anomaly data set has very large misfits mainly due to main field secular variation over a time span of almost 50 years and shorter period external field variations. Although the application of the CM4 model reduces most of these offsets, some offsets still remain. 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 -4^{th} 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.