Preliminary report on the paleointensity variation during 38-50 Ma deduced from the marine sediments recovered from the northwest Atlantic

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Variations of the intensity of the paleomagnetic field (paleointensity), which provide clues about the evolution of the geodynamo, are recorded in rocks and sediments. Marine sediments give relative paleointensity (RPI) continuously in time. For the period of 0-2 Ma global RPI stacks [1][2] have been reported based on numerous regional RPI records. For the period of 2-3 Ma there have been increasing number of regional RPI records [3][4]. However, published RPI records older than ~3 Ma are very limited in time and space: 14.5-18.5 Ma [5], 17.5-26.5 Ma [6], 23-41 Ma [7] from the equatorial Pacific; 23-34 Ma from the South Atlantic [8]. We have conducted a paleomagnetic study on the marine sediments recovered in the northwest Atlantic to extend our knowledge of the RPI variation in further geologic past, and report on the preliminary RPI results for the period of about 38-50 Ma.

Integrated Ocean Drilling Program (IODP) Expedition 342 recovered hemipelagic sediment drifts from Sites U1403 and U1408 in the northwest Atlantic, off the coast of Newfoundland [9]. Piston cores of the two sites were subjected to a series of the paleomagnetic measurements including analyses of natural, anhysteretic, and isothermal remanent magnetizations (NRM, ARM, and IRM). Excluding the intervals showing signs of probable dissolution of primary magnetic minerals (low ARM intensity intervals) and inhomogeneous magnetic grain sizes (mainly for low ARM/IRM intervals), RPIs were estimated based on ratios of NRM/ARM and NRM/IRM.

Considering age models of the studied cores [10][11], the resultant RPI records cover the Chrons 18 (38.5-41.1 Ma), 19 (41.1-42.9 Ma), 20 (42.9-46.4 Ma), 21r (47.8-48.6 Ma), and 22n (48.6-49.3 Ma). These records are characterized by RPI minima always at chron boundaries and large fluctuations between highs and lows during each chron. Such charactersistics are commonly recognized in the published RPI records back to 41 Ma [1-8]; this is first record to show that they persist at least since 49.3 Ma.

For the Chron 18 interval, we obtained RPI results from both sites, which are approximately 380 km apart (Figure 1). Our results show common features, including RPIs that are generally high during C18n.2n (39.6-40.0 Ma) and low during C18r (40.0-41.1 Ma). Prominent RPI lows, which appear to be almost equivalent to the RPI minima at other chron boundaries (*i.e.*, during Chrons 19, 20, 21r, and 22n), are also commonly recognized at ~40.5 Ma. We suggest that the RPI lows might be related to a failed geomagnetic reversal.

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