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Study on the Characteristics of the Heat Flow in Marginal Seas of The Northwest Pacific Ocean

Jiang Dexin*, **Zhang He** and **Jiang Zhenglong**
China University of Geosciences, China

Using the heat flow to study the deep structure of the lithosphere has been seen as a common and effective geophysical methodology. The current study focuses on the characteristics of the heat flow and its geological significance in marginal seas of the northwest Pacific Ocean. According to the 4001 heat flow data collected from the marginal seas, the distribution map of the heat flow in the northwestern Pacific Ocean is drawn. Based on the formation time of marginal seas, the frequency of heat flow distribution is calculated, while the heat flow value and the seabed geology are also comparatively studied. The distribution law of heat flow in the "Trench-Arc-Sea" system, the relationship between the structural properties of the lithosphere and the heat flow, as well as the controlling factors of the abnormal heat flow, have all been discussed in this study. The results of the current study show that the magnitude and the dispersibility of the heat flow in the marginal seas are roughly negatively correlated with their formation time. The formation time of the Sea of Okhotsk is earlier (30-65 Ma); correspondingly the heat flow value (86.8 mW/m^2) and the standard deviation (3.727) are relatively lower; whereas the Okinawa Trough is still expanding with its relatively high heat flow (139 mW/m^2) value and high standard deviation (7.001). In the "Trench-Arc-Sea" system, the heat flow value is characterized by identified as "Low (Trench) –High (Arc) -Relatively High (Marginal Sea)"; the heat flow value in Kuril-Kamchatka Trench, Japan Trench and Ryukyu Trench is about 30 mW/m^2, while their corresponding island and arc area heat flow values are that of two to three times. As the structural properties of the lithosphere are different, their heat flow values are obviously different. The heat flow values of the continental crust in marginal seas are overall lower than that of the oceanic crust. Likewise, different subduction properties have different effects on heat flow, the cold subduction of the plate leads to a lower heat flow value in the Kuril-Kamchatka Trench, while the hot water caused by the subduction fault increases the heat flow value of the oceanic plate outside the Japan Trench.

Biography:

Jiang Dexin is a postgraduate student in China University of Geosciences (Beijing) and born in Chongqing, China on Oct.3, 1995 and majoring in marine science oriented to the Analysis of Petroliferous Basins. He has received the bachelor degree in Petroleum Geology at Chengdu University of Technology, China in 2013 and Currently studying for a master degree in China University of Geosciences (Beijing), focusing on petroleum in the marine area.