INTRODUCTION

The Middle Amur sedimentary basin (MASB) is located in the conjunction zone between the Jiamusi–Lesser Khingan Massif and Sikhote-Alins orogenic belt [22] (see the inset in Fig. 1). This is a system of grabens and horsts [3] (Fig. 1).

The concepts of the tectonic nature of the MASB are changing. It was considered as an intermontane depression (E.B. Bel’tenev, M.G. Zolotov, and L.I. Krasnyi) and rifts [4], while B.A. Natal’in ascribed the MASB to composite sedimentary basins [12–14]. During the early stages, this basin evolved as a foredeep initiated ahead of the front of the masses transported in the northwestern direction, and, later, it converted into an extensional structure under the influence of strike-slip motions, which occurred between these two stages. Some researches [5] agree with such an interpretation of the MASB tectonic development but consider that the history of its formation is even more complex [5]. Of great importance in understanding the MASB formation is the information about its deep structure, which was obtained from data on a few structural and mapping boreholes and geophysical works. However, owing to the insufficient studying of the MASB, no models of its deep structure are presently available. In this relation, the objective of our research was to continue the study of the MASB deep structure using the method of magnetotelluric sounding. The investigations were carried out along a profile crossing the central part of the MASB (Fig. 1).

PREVIOUS GEOLOGICAL AND GEOPHYSICAL STUDIES OF THE REGION

Approximately 50 grabens and depressions are distinguished in the Middle Amur sedimentary basin. The largest of them are the Lobei–Biurofelskiy, Kur–Urmiiskii, and Pereyaslavskii (Fig. 1). Half-grabens, in particular, those with steep fault eastern and southeastern walls, are the dominating structures. In terms of the structure, size, and subsidence of the graben floor, three structural facies zones can be distinguished in the basin: the northwestern, central, and southeastern [3]. The northwestern zone (the Lobei–Biurofelskiy and Kur–Urmiiskii grabens) is bordered by the Lesser Khingan block of the Jiamusi–Lesser Khingan Massif in the northwest and by the Ul’dura–Churkinskii and Vandanskii uplifts (along the Tanlu fault system) in the southeast. It is characterized by gentle northwestern (Bureinskii) and steep southeastern fault walls, a clearly manifested NE-trending elongated shape, and depths from 1000 to more than 2500 m. The Central zone is represented predominantly by small grabens and vast but shallow (not deeper than 1000 m) depressions. Half-grabens with steep walls and a thickness of the Cenozoic cover of more than 1500–2000 m are found only in the region adjacent to the southeastern zone. The Southeastern zone (the Pereyaslavskii–Anuyiskii graben group) is bounded by the Sikhote-Alin Mesozoic structures in the southeast, while its northwestern margin is bordered by Mesozoic sedimentary volcanogenic structures of the Khehtsirskii Range and Petropavlovsk high of the Anuyiskii–Khungariiskii inlier. The grabens of this group are char-
Fig. 1. Tectonic map of the study region [adopted from Karsakov et al., 2005] with simplifications.
Main tectonic elements: (1) Jiamusi–Lesser Khingan Massif; (2) Sikhote-Alin orogenic belt; (3) Middle Amur sedimentary basin; (4) marginal troughs of different ages; (5) volcanic belts of different ages; (6) Late Cenozoic basalts; (7) main faults: (1) Ilan-Itun; (2) Kukan; (3) Amurskii; (4) Central Sikhote-Alinskii; (5) East Sikhote-Alin; (8) secondary faults; (9) sedimentary cover isopach contours of the Middle Amur sedimentary basin; (10) main grabens: (I) Pereyaslavskii, (II) Kur-Umisetskii, (III) Lobei-Birofeldskii; (II) locations of MTS and their numbers; arrows indicate the directions of the large axis of the polar diagram of the main impedance; (12) profile line; (13) measurement points of the heat flow and its value in mW/m².