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大陆深俯冲的最大深度——来自数值模拟实验的结果

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摘要:

采用粘弹性材料8块体有限元模型并设定温度场后进行的大陆深俯冲二维数值模拟表明,在组合载荷(负浮力、洋中脊推力从上到下10~30MPa和地幔对流拖曳力100MPa)作用下,陆壳俯冲实际垂向位移可达117km,最终俯冲深度达到147km,而洋壳实际垂向位移约162km,最终俯冲深度达到231km;在洋壳、陆壳俯冲到一定深度以前,它们的俯冲速度基本保持不变,表现为洋壳、陆壳底端的位移-时间曲线近似为直线;当俯冲时间超过9Ma,洋壳、陆壳分别达到167km、96km深度后,俯冲速度会越来越慢。

英文摘要:

Two-dimensional numerical simulation for continental subduction by means of a finite element model of 8 visco-elastic material blocks with a given temperature field indicates that under the combined action of three kinds of dynamic load including the negative buoyancy, the push force of the mid-ocean ridge 10 - 30MPa from upper to lower and the drag force connected with mantle convection 100MPa, the actual vertical displacement of the subducted continental crust can reach 117km and its final subduction depth is 147km; the corresponding data for the subducted oceanic crust are 162km and 231km, respectively. Before the continental and oceanic crusts are subducted to a certain depth, their subduction speed basically keeps from varying, it is shown that their bottom displacement-time history curve is a straight line approximately; however, after subduction time is larger than 9Ma and the subduction depths of the continental and oceanic crusts reach 96km and 167km respectively, their subduction speed becomes gradually slower.

关键词: [大陆深俯冲](#) [数值模拟](#)

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