Seismicity of northeastern Chukotka and western Alaska and the adjacent continental shelf region is the most intense in this region. Several ~M=7 earthquakes with epicenters located in Chukotka in the 20th century. Epicenters of M=6 earthquakes are located in the Seward Peninsula of Alaska. Due to the small number of regional seismic stations, data on the geodynamics of the Chukchi Peninsula were based only on teleseismic records until the end of 20th century. In the end of 2002 an M=4 earthquake occurred near the settlement of Neshkan on the coast of the Chukchi Sea. Although a relatively small mainshock, it was followed by many thousands of aftershocks spanning nearly two years. These events triggered integrated investigations of the nature of seismicity of this region. It was established that the seismicity of this region is governed by extensional geodynamics, discharge of which occurs in several narrow tectonic zones of north-east strike. They coincide with epicenters of earthquakes, hot springs, Quaternary volcanoes and modern rifts, one of them, lake Koolen, is a complete analogue of the lake Baikal by its shape and the ratio of axes. Similar seismicity also occurs in western Alaska. These zones are developed on the shelf. Other geodynamic effects, which are limited to the southern and eastern coasts of the Chukchi Peninsula and the northern continental slope, are related to isostatic leveling of the surface, which was covered with 2–2.5 km thick ice during the last glacial maximum. This effect causes "scattered" seismicity.