The source of the catastrophic Tohoku tsunami of 11 March 2011 was located close to the Russian Far East and the tsunami presented a serious threat for the coasts of the Kuril Islands and Kamchatka. The Tsunami Alert was declared for these regions; the people were evacuated from low-lying areas and the ships were directed into the open ocean. This tsunami was clearly recorded by a number of coastal tide gauges and bottom pressure stations. A network of precise coastal telemetric gauges, deployed by Russia during the last two years, has effectively measured the tsunami waves at 17 sites: Kuril Islands (3), Kamchatka (2), Commander Islands (1), Sakhalin Island (7), and Primorie (4). This tsunami was also recorded by the Russian open-ocean DART station 21401, located east of the South Kuril Islands, and by several temporary bottom pressure stations near the Kuril Islands. The data from the DART buoys located near Japan and in the vicinity of the Aleutian Islands were used for the comparison. These instruments enabled us to estimate major characteristics of the observed tsunami waves, including their arrival times, maximum wave heights, durations of the signal and main periods. We found significant differences in the spectral characteristics of tsunami waves directed eastward toward North America (DART 21418) from those directed to the Northwest toward Russia (DART 21401). The main peaks of the former were relatively of high-frequency (with periods of 6-8 and 15-20 min), while those of the latter were mainly of low-frequency (25-40 and 60-80 min). Pronounced spectral peaks with similar long periods were also found in the near-field records at Hanasaki (on northeastern coast of Hokkaido Island), Yuzhno-Kurilsk (Kunashir Island) and Malokurilskoe (Shikotan Island). At the far-field stations, the resonant periods associated with local topographic effects were predominant in the spectra. In contrast to the deep-sea stations where the first waves were the highest ones, the highest waves at Russian coastal sites (trough-to-crest heights of 2.3 m at Malokurilskoe and 2.0 m at Yuzhno-Kurilsk) were observed several hours after the arrival of the first tsunami wave.