Long-term current measurements have been conducted since February 1997 in the Tsushima Straits using an ADCP attached to a regular ferryboat between Hakata and Pusan. The thousands of observations for the last 10 years revealed many details of the Tsushima Warm Current (hereafter referred to as the TWC). In this study, the variation in the structure and volume transport of the TWC through the Tsushima Straits is studied. Since tidal currents are strong and comparable to the mean current, tides must be removed with accuracy. One problem in using regularly scheduled ferry service is that the observed current can contain significant aliasing errors associated with some of the tidal constituents. A robust estimation method to eliminate the effects of aliasing and tidal signals accurately leads to closer estimate of the volume transport. The 10 years average of the volume transport is 2.65 Sv, and those through the channels east (CE) and west (CW) of the Tsushima Islands are 1.20 Sv and 1.45 Sv, respectively. There is a remarkable difference in the seasonal volume transport variation between the CE and CW. The transport through the CE increases rapidly from winter to spring, and then decreases gradually as winter approaches. On the other hand, the transport through the CW increases gradually from winter to autumn, and then decreases rapidly as winter approaches.