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(Research Article)
Real-time acoustic tomography system and the experience of Caspian current sea monitoring

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Abstract

The Acoustic Tomography (AT) systems are used to monitor long-term and continuous flow in rivers, seas and oceans. One of the disadvantages of existing systems in Iran is the inability of real-time/automated measurements. In this study, by adding a raspberry Pi computer to the system and performing the required programming, it was possible to do online monitoring. The data are transferred to the Raspberry Pi using the LAN and then sent over the Internet. Then, the 10-AT system was tested in Iranian waters. Two AT systems were installed on two fixed boats at a depth of 13 meters at a distance of 3 km from each other in the Caspian Sea. Their transducers were suspended at a depth of 6 meters. Acoustic signals were transmitted every minute. The results showed that the speed of sound and water velocity are 1460 and 0.2 m, respectively. Also, assuming the salinity to be constant, the water temperature was calculated 14 ˚C. Due to the facility of online monitoring of marine currents and the provision of environmental information, the use of this method in the coastal areas of the Caspian Sea, the Persian Gulf and the Makran coasts is recommended.

Keywords: Raspberry Pi, 10 kHz, Real-time data, Sound speed, Current velocity, Water temperature, Continuous monitoring, Marine currents.

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