



Development and performance analysis of satellite communication system for real-time river monitoring

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ABSTRACT

K-water uses its Koreasat No. 5-based communications network for remote acquisition and provision of hydrological information on rainfall, water levels, water quality, and warnings via its hydrological observation network. The satellite is greatly affected by the rainfall attenuation during heavy rainfall seasons and typhoons since it is using the Ku-band frequency. K-water used the site diversity (SD) technology and developed a duplexing system that involved the setup of its main hub station at its headquarters and its auxiliary hub station at Gunnam Dam located at 200 km away, to smoothly use its data during rainfall attenuation and satellite malfunctions. In this paper, we proposed an online monitoring SD system in the communications satellite equipment and manual/automatic switching algorithms. We examined the SD effects in the projected site to improve the stability and reliability of K-water's hydrological communications satellite. Data reliability was found to be improved to 96.7% through the comparative study of the existing and SD systems, in which present data observation failure occurred in all 418 terminal stations, but proposed method occurred only in 14 terminals.

Keywords: Satellite; Communication; Site diversity; Rain attenuation; Switchover

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