

Application of Hydrologic Telemetry System of Karot Hydropower Station Based on Beidou Communication Technology

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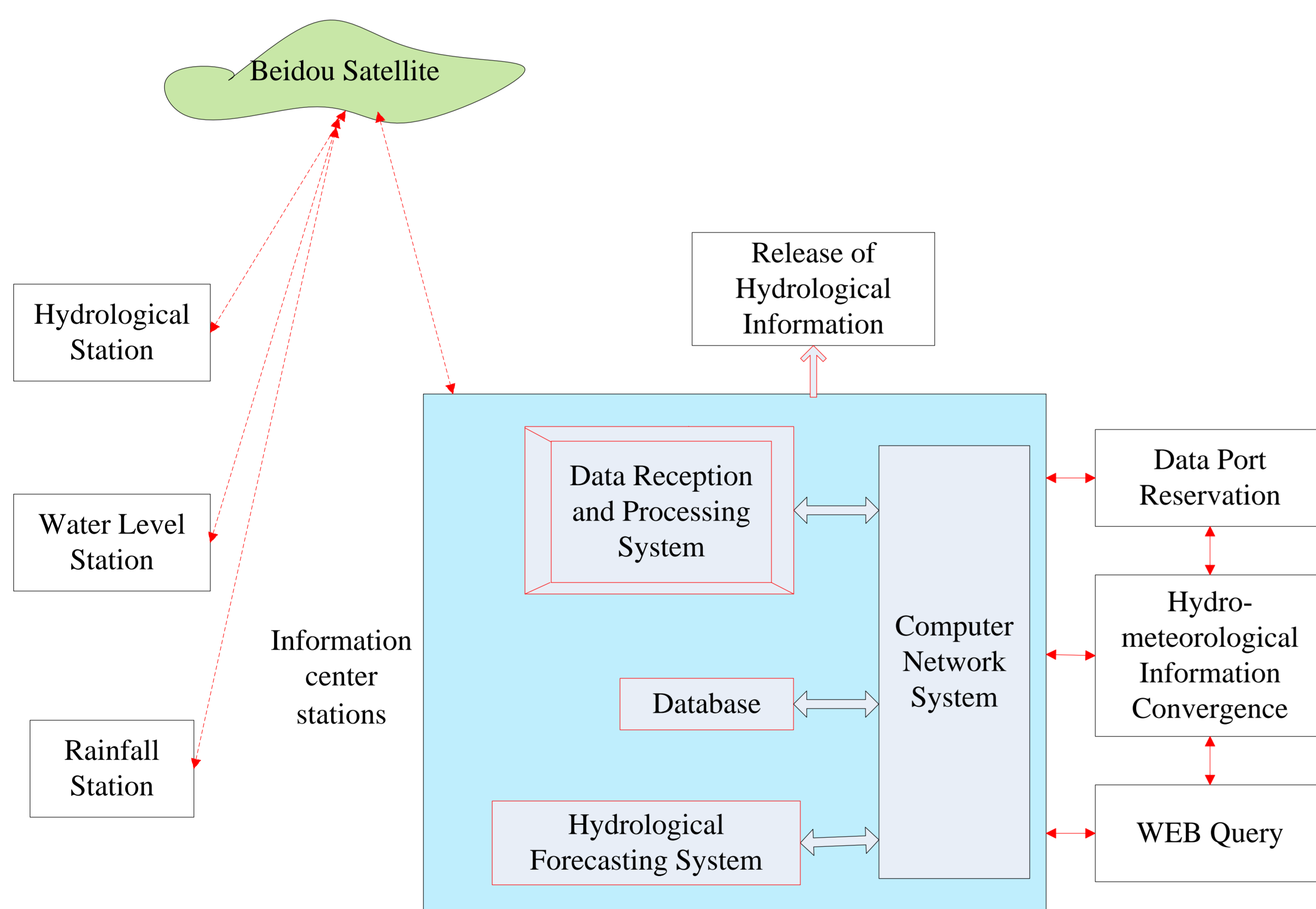
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Objectives

The hydrologic telemetry system of Karot Hydropower Station uses Beidou communication technology, in order to ensure the engineering water regime and enhance the capacity for water and drought disasters in the basin. It also takes into account the need for hydrologic information services for the hydropower station, flood control, and other scheduling after the completion of the station, and solves the problems of building the station and equipment performance issues in the basin above the Karot Hydropower Station dam site, such as large elevation drop, lack of public communication network, and complex climate conditions.

Methods

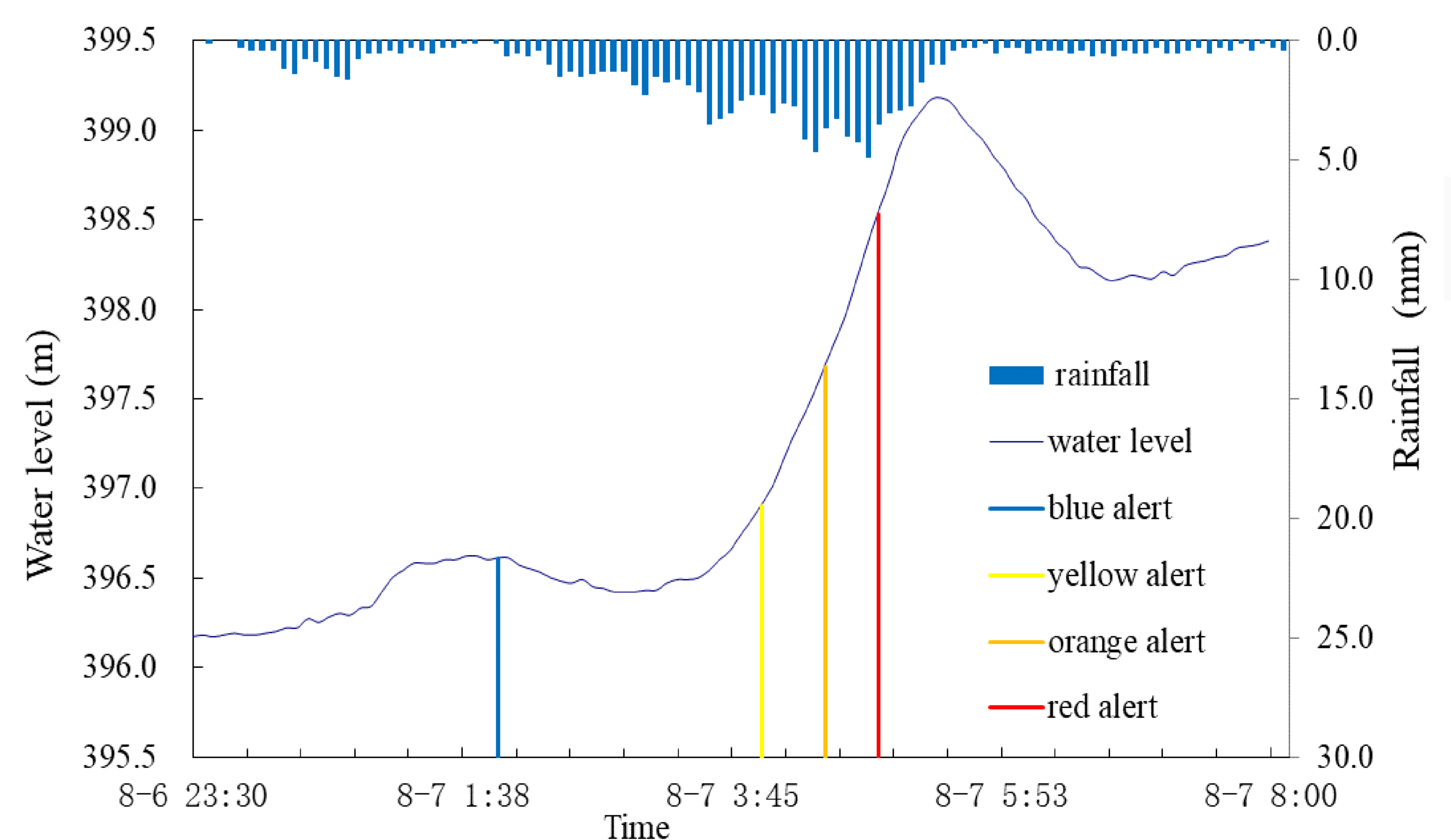
Through reasonable design and networking methods, the overall design scheme of the system is as follows.



Results

The average patency rate from 2017 to 2022 is very high, 94.9%, 97.1%, 98.2%, 95.6% ,96.0% and 96.3% respectively; According to operational statistics on the working system, communication networking method, and equipment power consumption of the system telemetry station, it was found that the battery of the system telemetry station can ensure the continuous use of satellite terminal equipment for more than 40 days under adverse

conditions such as continuous rain and damage to charging equipment. Due to the short capture time caused by power-on startup and lockdown of satellite terminal equipment, the equipment has low power consumption and can complete data collection and ensure data accuracy for all stations in a short period of time. The telemetry stations can adapt well to outdoor working environments in vast areas with altitudes of 600-3500 meters, varying climates such as high temperature and humidity, and significant temperature differences between day and night; On September 6, 2021, from 19:00 to 21:00, the rainfall in the reservoir area was 133.0mm, and the maximum hourly rainfall was 82.5mm. In 2022, when it encountered heavy rainfall in Pakistan, the system still operated stably and exhibited strong resistance to rain decay and lightning strikes.



Graph of surface rainfall, water level process and early warning period (2018)

Conclusions

By fully utilizing the advantages of Beidou communication technology and adopting reasonable communication and networking methods, the system provides strong technical support for the safety of flood control during the construction period of the Karot hydropower station. The application of the hydrologic telemetry system of the Karot hydropower station can provide a demonstration and reference for the water situation monitoring and reporting systems of cascade hydropower stations in the basin and similar regions.