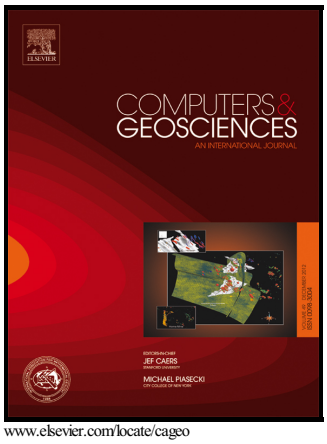

www.elsevier.com/locate/cageo

Design and implementation of a data distribution system for Xiaoqushan submarine comprehensive observation and marine equipment test platform

Hui Chen, Huiping Xu, Yang Yu, Rufu Qin, Changwei Xu

PII: S0098-3004(15)00113-2
DOI: http://dx.doi.org/10.1016/j.cageo.2015.05.009
Reference: CAGEO3545

To appear in: *Computers and Geosciences*

Received date: 2 September 2014
Revised date: 15 April 2015
Accepted date: 13 May 2015

Cite this article as: Hui Chen, Huiping Xu, Yang Yu, Rufu Qin and Changwei Xu, Design and implementation of a data distribution system for Xiaoqushan submarine comprehensive observation and marine equipment test platform, *Computers and Geosciences,* http://dx.doi.org/10.1016/j.cageo.2015.05.009

Design and Implementation of a Data Distribution System for Xiaoqushan Submarine Comprehensive Observation and Marine Equipment Test Platform

Hui Chen, Huiping Xu*, Yang Yu, Rufu Qin, Changwei Xu
(State Key Laboratory of Marine Geology, Tongji University, Shanghai, China)

Abstract: One of the major issues concerning undersea observation data is data distribution characterized by multi-disciplinary, multi-parameter and weather-independent continuous observations. It describes the data distribution system for Xiaoqushan Submarine Comprehensive Observation and Marine Equipment Test Platform (XSCOMETP). Based on the design of C/S architecture, the overall system establishes a communication link between the observation infrastructure and the data center using Socket technology. The Data Distribution System for XSCOMETP was developed by C# in the .NET framework, which enabled multi-source and heterogeneous data to be acquired, interpreted and stored in real time. The system can be divided into three functional modules including data acquisition and transmission, data interpretation and storage, and data display. Given the successful trial from August 11, 2013, the data distribution solution proposed in this paper could be a useful reference implementation to the East China Sea Seafloor Observation System.

Keywords: Seafloor observation system; Data distribution; Real-time interpretation; "Hot Swapping" interpretation

1. Introduction

As the third platform to observe the marine (Wang, 2007), seafloor observatory, which enables three-dimensional monitoring from sea surface to the bottom and shifts from an intermittent expeditionary mode to a sustained, in situ experimental mode utterly alters the way to understand the ocean (Clark, 2001). The demand of seafloor observatory comes from seismic monitoring (Sutton, McDonald, Prentiss, & Thanos, 1965), and there were two different sources for the early seafloor observation. One is monitoring the undersea earthquake; another is monitoring the marine environment. In 1978, the Japan Meteorological Agency put the connected seismographs on the bottom of the seafloor to monitor the earthquake, which was the prototype of the seafloor observatory (Suyehiro, Mikada, & Asakawa, 2003). While the first ecological monitoring station was established in America, which named Long-term Ecosystem Observatory at 15 meters (LEO-15). LEO-15 carried out seafloor observation in 3km x 3km dimensions, which had recorded sediment transport along and across the coast and the shelf and many biogeochemical processes for years. For instance，two years of wave observation since 1994 recorded 51 sediment transportation events, with 32 of them being caused by winter storm turbulence. Besides, 63% of the events took place in winter (Styles & Glenn, 2005). For another instance, LEO-15 recorded the temperature and Chlorophyll concentration of water column in July[1], 1997. Clearly, it also recorded the start of upwelling and the rapidly increased productivity consequently in 1999 (Schofield, Bergmann, Bis-

*Corresponding author. E-mail address: xuhuiping@tongji.edu.cn (Huiping Xu).