

A ocean bottom vector magnetometer

Xiaomei Wang, Yuntian Teng, Chen Wang, and Jiemei Ma

Institute of Geophysics, China Earthquake Administration, China (wxm@cea-igp.ac.cn)

The new development instrument with a compact spherical coil system and Overhauser magnetometer for measuring the total strength of the magnetic field and the vectors of strength, Delta inclination - Delta declination, meanwhile we also use a triaxial fluxgate instrument of the traditional instrument for geomagnetic vector field measurement. The advantages of this method are be calibrated by each other and get good performances with automatic operation, good stability and high resolution. Firstly, a brief description of the instrument measurement principles and the key technologies are given. The instrument used a spherical coil system with 34 coils to product the homogeneous volume inside the coils which is large enough to accommodate the sensor of Overhauser total field sensor; the rest of the footlocker-sized ocean-bottom vector magnetometer consists of equipment to run the sensors and records its data (batteries and a data logger), weight to sink it to the sea floor, a remote-controlled acoustic release and flotation to bring the instrument back to the surface. Finally, the accuracy of the instrument was tested in the Geomagnetic station, and the measurement accuracies of total strength and components were better than 0.2nT and 1nT respectively.

The figure 1 shows the development instrument structure. it includes six thick glass spheres which protect the sensor, data logger and batteries from the pressures of the deep sea, meanwhile they also provide recycling positive buoyancy; To cushion the glass, the spheres then go inside yellow plastic "hardhats". The triaxial fluxgate is inside No.1 glass spheres, data logger and batteries are inside No.2 glass spheres, the new vector sensor is inside No.3 glass spheres, acoustic communication unit is inside No.4 glass spheres, No.5 and No.6 glass spheres are empty which only provide recycling positive buoyancy. The figure 2 shows the development instrument Physical photo.