

## Global Positioning System

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### Abstract

Presently, Global Positioning System satellites provide earth scientists with unprecedented location capability, with varying degrees of accuracy/precision, and at a variety of costs. Our experience is based on an attempt to find the most cost-effective Global Positioning System receiver corrected by Wide Area Augmentation System signals while retaining the mobility required for mapping in dense or rugged terrains. We have tested three Global Positioning Systems, ranging in cost from \$200 to \$ 5000, in a variety of terrains. Although the primary goal of the study was to quantitatively measure the precision and accuracy of the Global Positioning System /Wide Area Augmentation System combinations in a variety of locations and field conditions, we have also acquired a great deal of experience in the logistics of transporting Global Positioning System equipment to and from the field, and ensuring that batteries, software, cables, etc., are in working order so that it is possible to collect data in the field. In addition to the logistical aspects of the study, the authors found significant variations among the performance of various GPS/WAAS combinations that may be critical to accurate geological mapping; performance differences are not necessarily correlated with cost. Our study also compares roving Global Positioning System /Wide Area Augmentation System combinations with traditional transit surveying instruments in a demanding swamp environment. In our experience, the best scenario is to use both traditional and Global Positioning System surveying techniques whenever possible as independent checks, and it is inadvisable to depend solely on a Global Positioning System /Wide Area Augmentation System position fixes without reference to USGS quadrangles. With favorable conditions and adequate planning, it is not difficult to consistently acquire location data that exceeds the accuracy of USGS 7.5 minute quadrangles (+/- 7 meters) in real-time using Global Positioning System /Wide Area Augmentation System receivers.