

Using coherent Doppler lidar to estimate river discharge

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Abstract

A major component of the hydrologic cycle is river discharge. Within the continental USA, the USGS operates nearly 7000 stream gaging stations. For much of the rest of the world major river discharge is poorly, sparsely or not monitored at all. In preparation for a shuttle demonstration of coherent Doppler lidar wind observing, it was determined that the assumption of a zero velocity for the surface return was probably not valid for a large fraction of the globe. Ocean currents, river currents, blowing sand or dust near the surface, or even swaying trees violate that assumption. However, what appeared as a confounder for shot to shot velocity calibration may actually be useful information to oceanographers and those involved with river flow. This paper describes the current status of efforts to determine both the usefulness of an observation of the river surface velocity and the feasibility of obtaining such information from a space-based Doppler lidar.