



Automatic river discharge monitoring system, preliminary results

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Standard methods used at sea for flow and discharge measurements are not easily applicable in the proximity of river mouths for different reasons, particularly in the case of strong river outflow events.

Usually, water level measurements are used in discharge computations, but these are greatly influenced by tides in a tidally-dominated system. Additionally, the river mouth zone is characterized by a bi-directional flow, with salty water entering the river over the bottom and freshwater exiting at the surface. Also, a standard current-meter cannot be safely moored at the surface during strong river outflow events. On the contrary, an Acoustic Doppler Current profiler positioned over the river bottom can measure the water velocity in the entire water column.

The OGS, within a framework of the Palme project (a Civil Defense-sponsored project for the coastal monitoring of the Friuli-Venezia-Giulia Region) has developed 2 innovative permanent stations for the continuous real time measurement of the river flow at the mouth of the Isonzo and Tagliamento Rivers. The monitoring stations are equipped with 2 Nortek 1000 kHz Aquadopp profilers fixed at the river bottom by means of an immobile stainless steel structure. The profilers acquire data every 5 minutes (cell size = 0.5 m) over the entire water column. Each instrument is connected with a submarine cable to a station on land located about 10 m from the river bank. The land station is equipped with a gsm modem and a power supply system with batteries recharged by solar panels. The monitoring system is therefore completely autonomous with respect

to the power supply and the data transfer. The data are automatically downloaded every 6 hours (every 20 minutes or less when necessary) and are available at the main office of the Civil Defense of the Friuli Venezia Giulia region where they can be used immediately to support decisions in case of extreme outflow events.

The 2 stations are active since February 2004.

The collected data are then processed using additional data coming from other instruments also (i.e. atmospheric pressure data). They are then extrapolated close to the surface and along the entire section of the river, and finally the discharge value is calculated at 5 minute intervals using the morphological data of the river bed.