

## **AUTOMATIC WATER LEVEL RECORDING SYSTEM** (with telemetric data transmission)

### **Background:**

The hydrostatic pressure in the seawater and in the shallow aquifers near the coast increases due to high tides, tsunamis, submarine earthquakes and similar phenomena. Therefore, it may be possible to infer / predict such events if the hydrostatic pressure variations in such area are continuously monitored accurately and warn public around who might get affected.

IGIS at Hyderabad has developed a comprehensive system of instruments to measure small changes in hydrostatic pressure. The system comprises 30 instruments-one of them commits of a pressure transducer, while the other 29 instruments commit of mechanical float-switch mechanism. There are two console panels with ground electronics to convert the measured parameters into water level changes in cm / m each console has 15 channels to which 15 measuring sensors are connected. The electronics are powered by rechargeable batteries, which are continuously charged by solar panels.

The instrument with pressure transducer is submerged in the sea and anchored to the sea bottom. 14 other instruments with float switch system are installed in shallow bore wells drilled perpendicular to the coastline at a short interval of 10m. These 14 sensors and the pressure transducer system at the sea bottom are connected to the 15 channels of one console system. Similarly 15 shallow boreholes are made in a line parallel to the earlier alignment at a distance of about 1km and the remaining 15 instruments with float switch system are installed into these boreholes and connected to the 15 channels of the second console panel.

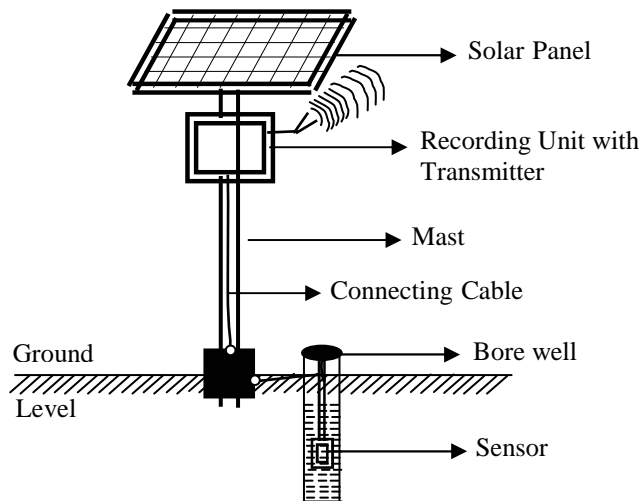
The data collected will be stored in data logger and will be retrieved as per needs. The continuous data acquisition and real time analysis with enable to infer the causes for the hydrostatic pressure variations.

One such system is developed for a research project by Department of Geology and Research Center, Tuticorin and is about to be installed and commissioned shortly in Tamil Nadu coastal region.

**Objective:** To monitor the groundwater the groundwater levels and sea level fluctuations along the coast near Tuticorin with automatic water level recorders in order to establish a relation between groundwater levels and tidal waves to help in Tsunami studies.

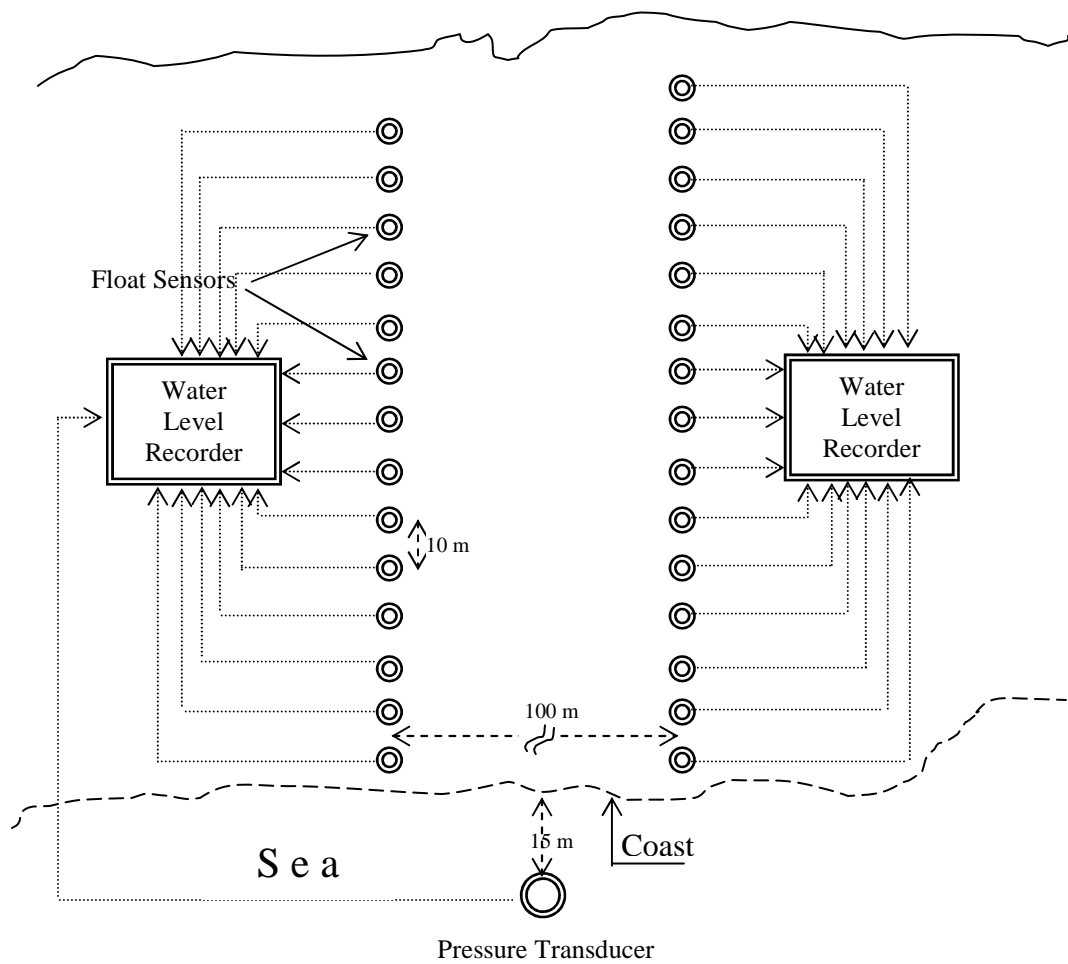
**Role of IGIS:** The studies are sponsored by Department of Science & Technology, Government of India, New Delhi. At the request of the Project team, IGIS designed, developed and established the field equipment.

**Water Level Recorders:** IGIS make Automatic Water Level Recorder (AWLR) is a microprocessor based instrument for measuring water levels in bore / tube / open wells using the principle of hydrostatic pressure sensing. It is capable of taking measurements at programmable intervals, store and transmit the data to the desired remote destination through GSM network. Alternatively the data can also be retrieved at a remote station.



*Automatic Water Level Recorder (Schematic)*

**Experimental set-up:** IGIS has developed, designed and fabricated the above shown Automatic Water Level Recorder. two such Recorders were manufactured for the above mentioned project. Each recorder has 15 channels. The experimental site was selected close to the sea coast near Tuticorin basis on several factors. 29 Float Sensors were installed in shallow borewells aligned along two lines perpendicular to the coast and one Pressure Transducer was installed in shallow waters of the sea just 15 meters form the water front. The The schematic experimental set-up is given below:



Schematic Experimental Field Set-up

Following are some of the field photographs taken at the time of installation.



Shallow borewell with float sensor. The cable connecting the float sensor to the 15-channel Water Level Recorder passes through the plastic pipe.



Array of 15 borewells in which the float sensors are introduced and connected to the 15-channel Water Level Recorder.



Pressure transducer introduced into the hollow pipe connected to the dead weight to be installed on the shallow sea floor 15 m inside the water front.



15-channel Water Level Recorder with built-in micro-processor and embedded software to record the water levels at 10 minute interval, store the data in memory and also transmit the data through telemetric system to be accessed anywhere in the world.