**All Weather Precipitation Gauge (AWPG)**

**Sensor:** All-Weather Precipitation Gauge

**Manuf/Model:** Geonor, T-200B

**Description:**
The Geonor precipitation gauge is a weighing type gauge.  The T-200B uses vibrating wire strain gauge load cells to continuously weigh the collection bucket.  The collection bucket is suspended by three vibrating wire sensors.  Most gauges in the USCRN have a capacity of 600 mm precipitation, but in some remote or very wet locations, a 1000 mm capacity gauge is used to extend the time before the gauge reaches capacity and needs to be drained.

**How is it installed?**
The gauge is mounted to a poured concrete pedestal such that the gauge opening is about 1.5 m above the ground.  A controlled heater is attached to the outer surface of the inlet throat of the gauge so that wet snow between -10°C and +5°C does not clog the opening, but slides in instead. The gauge is surrounded by a Small Double Fence Intercomparison Reference (SDFIR) Shield and a Single Alter wind/snow shield.  In cold weather, an antifreeze mix is added.

**Why measure this parameter?**
Precipitation amounts (accumulations) are a primary measurement for the USCRN Program. A separate instrument called a disdrometer or wetness sensor measures whether precipitation is falling at a given time (Vaisala DRD11A Rain Detector) and is important to the final calculation of precipitation. In addition, a secondary precipitation gauge based on a tipping bucket approach is also used as a back-up to the primary gauge during non-freezing conditions (Hydrological Services America Model TB-3 Tipping Bucket Rain Gauge).

**How is precipitation derived?**

Each vibrating wire load cell, when excited with a 12V DC electric pulse, outputs a frequency (Hz) relative to the weight in the collection bucket. A calibration equation relates the frequency to the equivalent depth of precipitation that passes through the 200 cm$^2$ inlet throat of the gauge. A complex calculation algorithm is then used to convert these 5-minute averages of depth measured by the three individual load cells, plus the wetness state, into final 5-minute precipitation amounts.

a



b
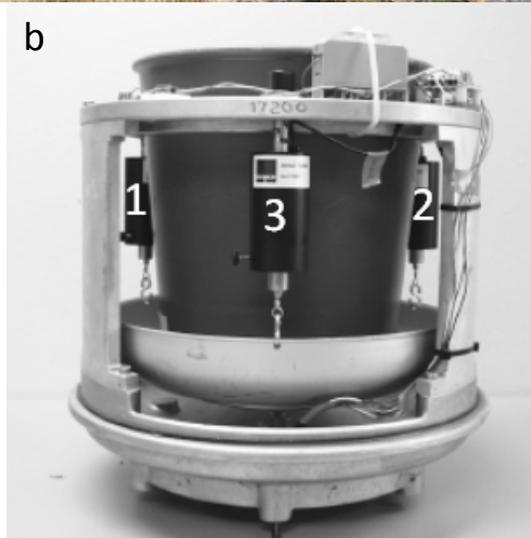


Photographs of (a) USCRN Geonor-T200B gauge within both a small double fence intercomparison reference shield and an Alter shield near Merced, CA, and (b) a view of three vibrating wire load sensors (redundant technology) used to monitor gauge depth.