**New Rhizon in situ sampler for pore water studies in aquatic sediments:**

For example nutrient input from submarine groundwater discharge in coastal areas.

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1. **Introduction**

   This study presents a new developed Rhizon In Situ Sampler (RISS). Rhizon soil moisture samplers (Rhizon SMS) are usually used in soil and agriculture sciences. They offer the opportunity to sample fluids from unsaturated soils by a non-destructive technique (Hijma and Van Noordwijk 1991). The RISS supports studies of seasonal variations in pore water composition, e.g. due to a minimal impact of the sampler on the sediment-pore water system. The RISS can easily be combined with benthic chambers, allowing pore water sampling at the same location as the flux studies.

2. **Material and Procedures**

   To minimize any disturbance caused by inserting the sampling device, the basic idea of the Rhizon in situ pore water sampler is to bring Rhizons into the sediment depth where pore water samples should be obtained and then move the Rhizons sideward into the sediment. For this purpose we built the Rhizon in situ sampler (RISS) (Fig. 1) which consists of a platform which can be pushed gently into the sediment. Within a groove, the Rhizons are protected during insertion of the platform into the sediment. With two rhizons from the Rhizon cache retrieved out of the groove as well as back into it and guided to the sampling location. This ensures that the filter section of the Rhizon is several centimeters away from the platform. The Rhizons are connected to a sampling device (e.g. syringe sampler or peristaltic pump/tubing).

3. **Assessment**

   **Tracer studies**

   Fig. 2. Laboratory setup for Sodium Fluorescein (NaF) tracer tests. Rhizons are installed in sediment filled aquariums. NaF was added to the water overlying the sediment directly before the peristaltic pump starts to sample from the Rhizons. The retrieved fluids were separated into fractions of 1 ml.

   **Results**

   Fig. 4. Chamber deployment: Rhizon in situ sample (RISS) combined with a benthic flux chamber.

   **Numerical modeling of catchment area**

   **4 Conclusion**

   The results from the RISS indicate it is a very useful tool to sample pore water with minimum disturbance and it is even possible to apply a RISS underwater devices investigating the sediment-water interface (e.g. benthic chamber). Due to the distance of the filter section to the platform used to place the Rhizon in the sediment this technique is less prone to artifacts as channelling of bottom water along sediment cores or suction samplers. This allows long term deployment and repetitive sampling of pore water at one site.

**References:**
