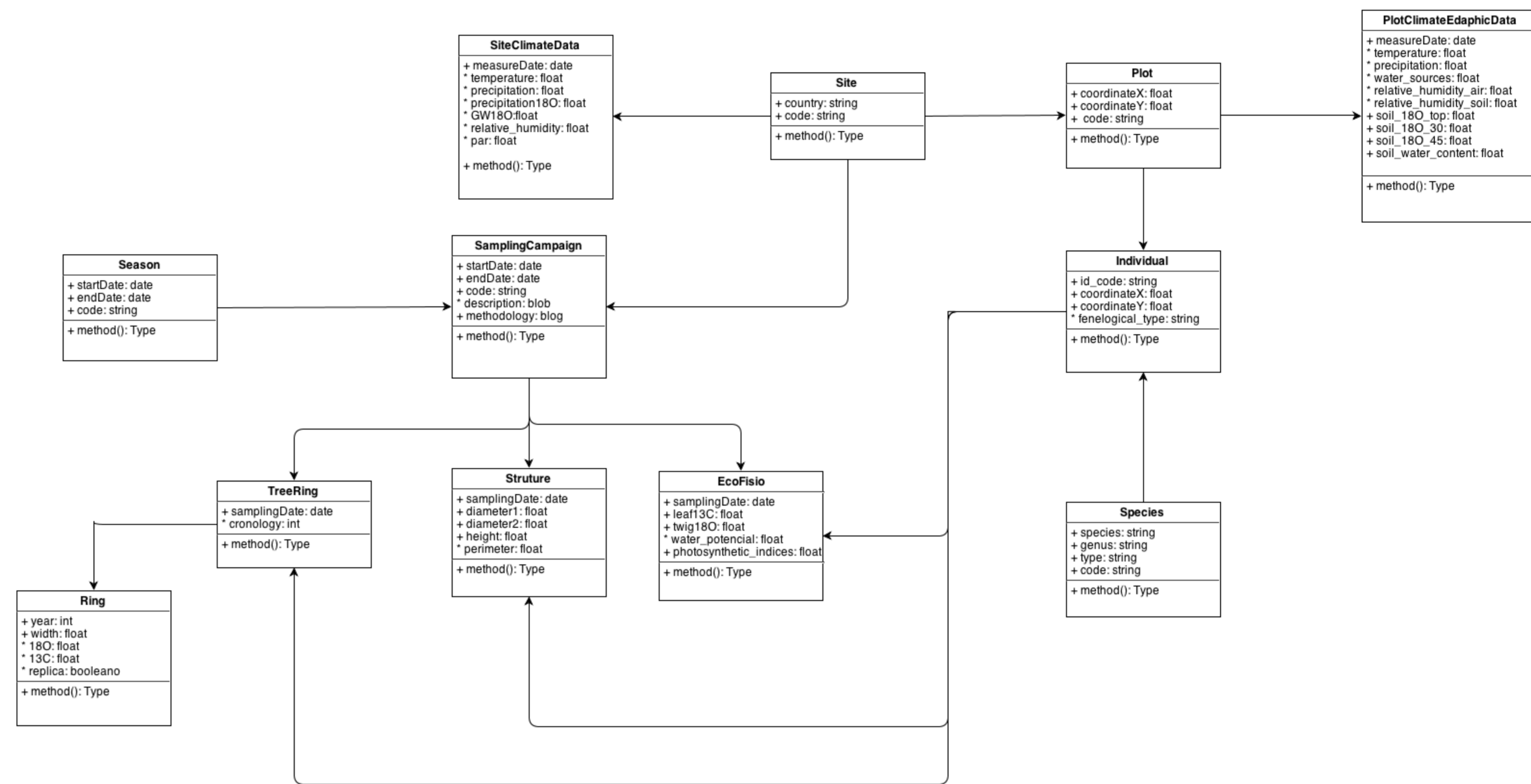


# Coastal dune forests under scenarios of Groundwater limitation: from Tropics to Mediterranean - *GW TropiMed* PROJECT

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Groundwater (GW) changes is important to vegetation as can produce dramatic changes in plant communities, on physiological performance or survival of plant species. GW lowering and surface water diversions will affect vulnerable coastal dune forests, ecosystems particularly sensitive to GW limitation and inevitably affect GW-dependent species. Sand dune plant communities encompass a diverse number of species that differ widely in root depth, tolerance to drought and fluctuations of the water table, and capacity to shift between seasonal varying water sources. The high ecological diversity of sand dune forests, can occur in different climatic regions of the globe. Such is the case of Tropical, Meso-mediterranean and Mediterranean areas, where future climate change is predicted to change water availability.



The **core idea** of this project is to evaluate, along a climatic gradient, the capacity of different plant communities to adapt to future scenarios of changing GW by an integrative spatial approach of GW stress indicators.

The large-climatic-scale study, covering Brazil, Portugal and Spain, will provide an excellent experimental condition to study the GW dynamics and community functioning in natural ecosystems of high ecological value. To fulfill the main objective, suitable short- and long-term GW limitation stress indicators will be integrated in spatio-temporal water dynamics. In a global consortium partnership, 4 main tasks will be developed in this project:

### Task 1

Installation of experimental plots; Characterize and understand plant functional groups water use in a GW limitation situation in a climatic gradient

### Task 2

Understand ecophysiological responses of functional groups in a GW gradient and define suitable **short-term stress indicators** in GW limitation scenarios, using stable isotopes (leaf  $^{13}\text{C}$  and xylem  $^{18}\text{O}$ ) and photosynthetic indices as the main approach

### Task 3

Estimate important factors that could function as GW **long-term stress tracers** and evaluate long-term stress sensitivity of the functional groups to temporal changes in water availability, through the use of **tree-ring isotopic signal** ( $^{13}\text{C}$  and  $^{18}\text{O}$ ) as an archive tool

### Task 4

Develop a model to evaluate community water use and response under future groundwater change scenarios through ecophysiological parameters

## 3 Sites with GW gradient:

**Brazil Tropical**

**Ubatuba**

**Meso-mediterranean**

**REN Osso da Baleia**

**Mediterranean**

**Estación Biológica Doñana CSIC**

Ultimately, this approach will contribute to trace GW stress in vegetation in an early stage and help to manage vulnerable communities