

Estimation of stand transpiration in two pine forests along the Túría river basin (Eastern Spain), an eco-hydrological approach

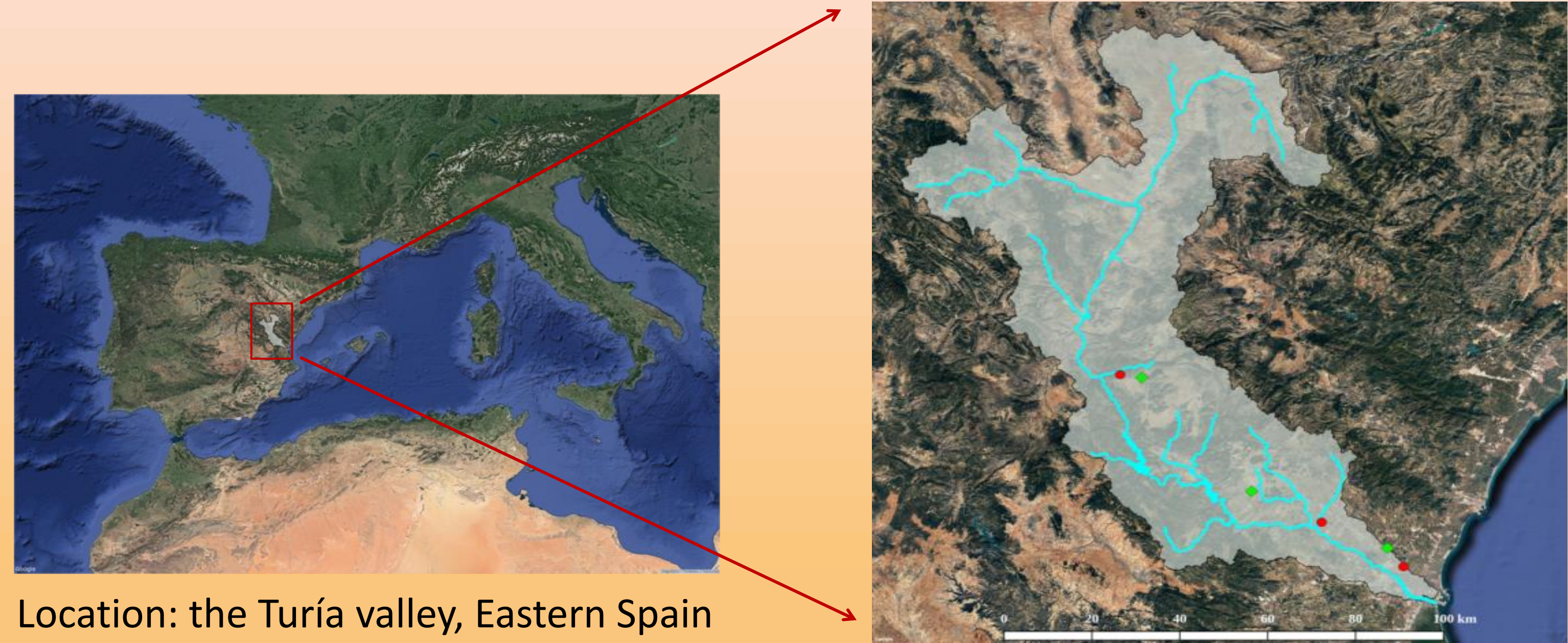


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Motives and Objectives

- The aim of this research is to generate a long-term database monitoring seasonal transpiration in two different pine forests to track the spatial and temporal variation in amount of water vapour deriving from the vegetation cover into the atmosphere along a coastal valley in Eastern Spain.
- This presentation shows the quantification of sap-flow as an indicator of stand transpiration in two different pine plots along the valley, from winter to summer 2017.



Location: the Turía valley, Eastern Spain

Methods and Instrumental Deployment

- Pine plots were located at two sites: coastal area and inland, located 50 km apart, one site being at 200 m a.s.l. (coastal zone), and the other site located at 1200 m a.s.l. (inland).
- On-site measurements included sap-flow (Heat ratio method), soil moisture (m³/m³), relative humidity (%), temperature (C°) and precipitation. Equipment was installed between January – March, 2017. All instruments were logged every half an hour. Vegetation characteristics was preformed on site and soil properties analysed.



Pluviometer

Sap-flow installment

Soil moisture probes

Results

Vegetation Characteristics

Strata	Experimental sites		F value
	Coast (%)	Inland (%)	
Trees	56,33±5.63	80,17±6.67	7,452
Shrubs	50,00±7.84	75,67±15.72	2,135
Dwarf shrub	0,75±0.38	4,00±1.53	4,261
Herbs	17,00±5.30	17,00±16.50	0,000
Litter	75,58±5.30	82,58±16.50	0,576
Moss	0,83±0.44	10,00±3.61	16,567 *
Stone	25,67±9.62	3,00±0.87	5,508
Total plant cover	124,10±15,79	176,83±3,67	10,587 *
Species richness	9,00±1,73	7,33±0,88	0,735

* p-value < 0,05

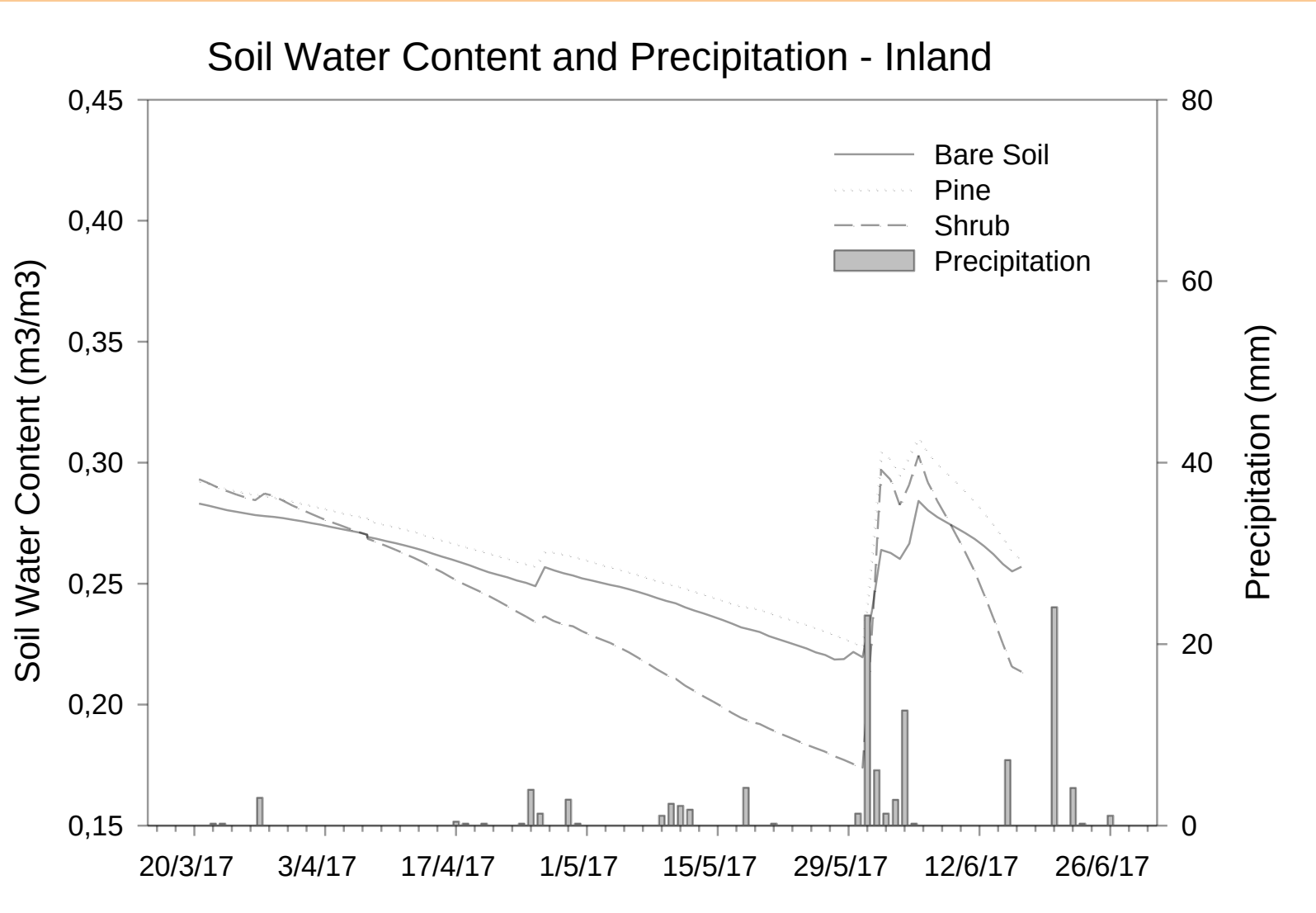
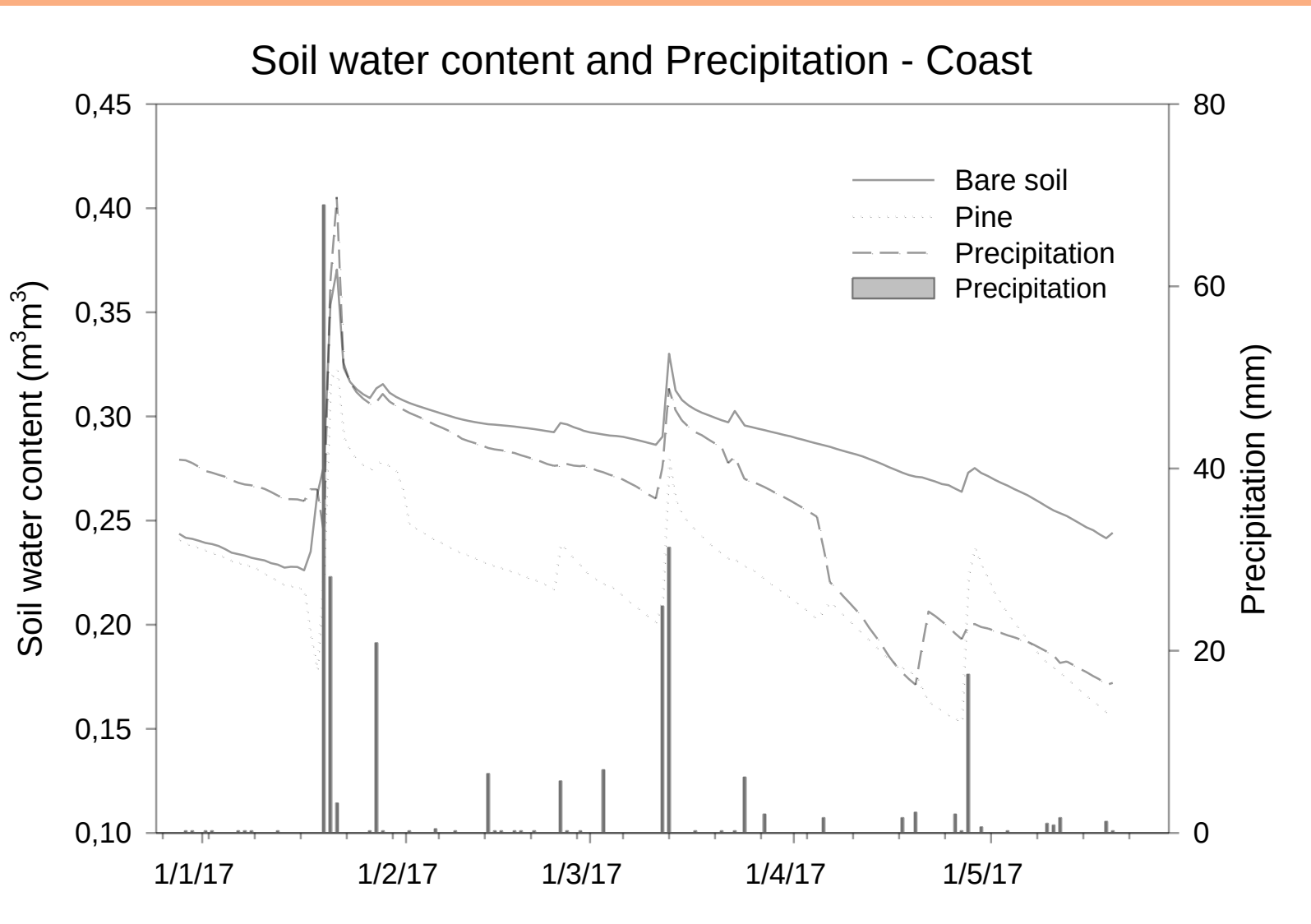
Coast



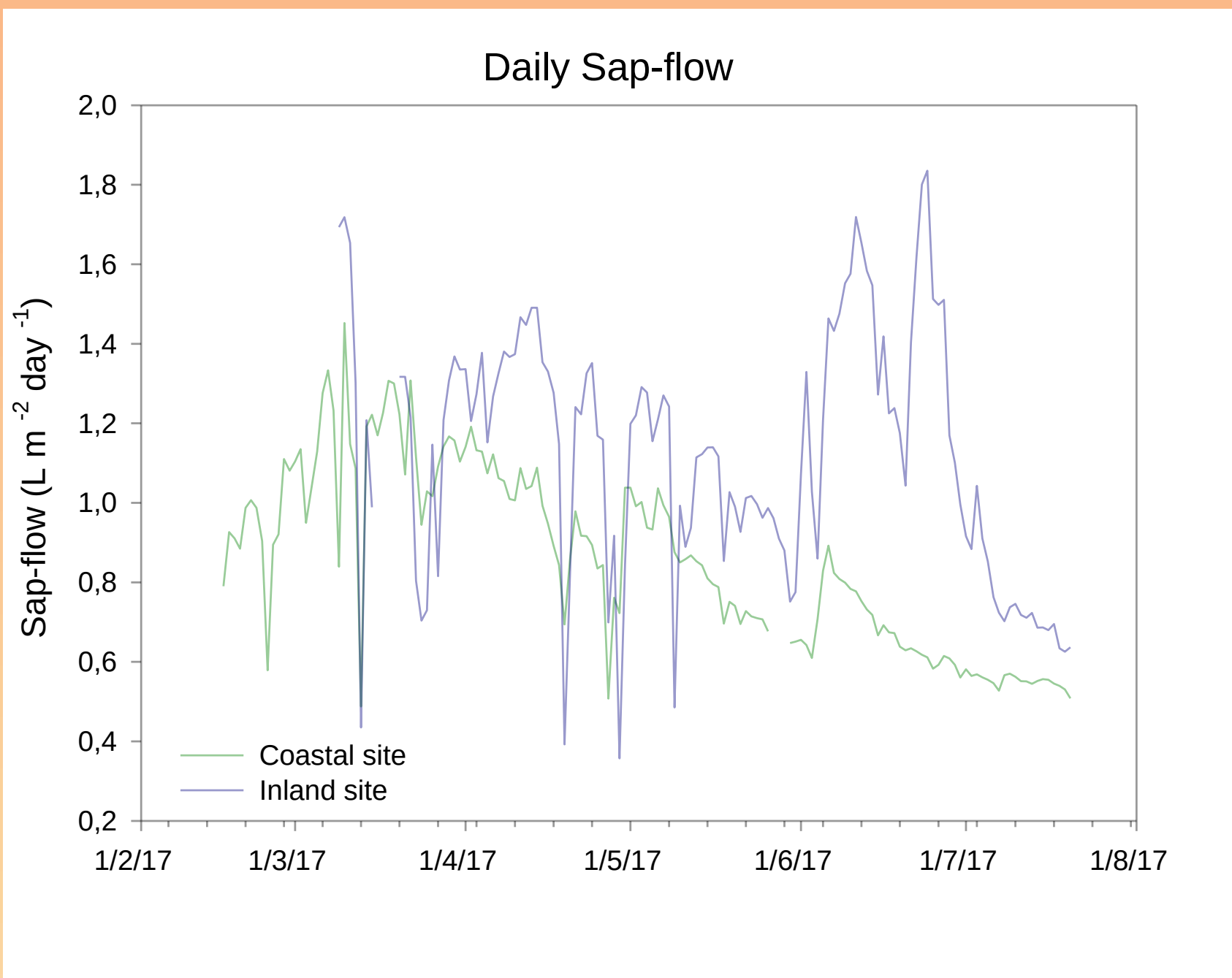
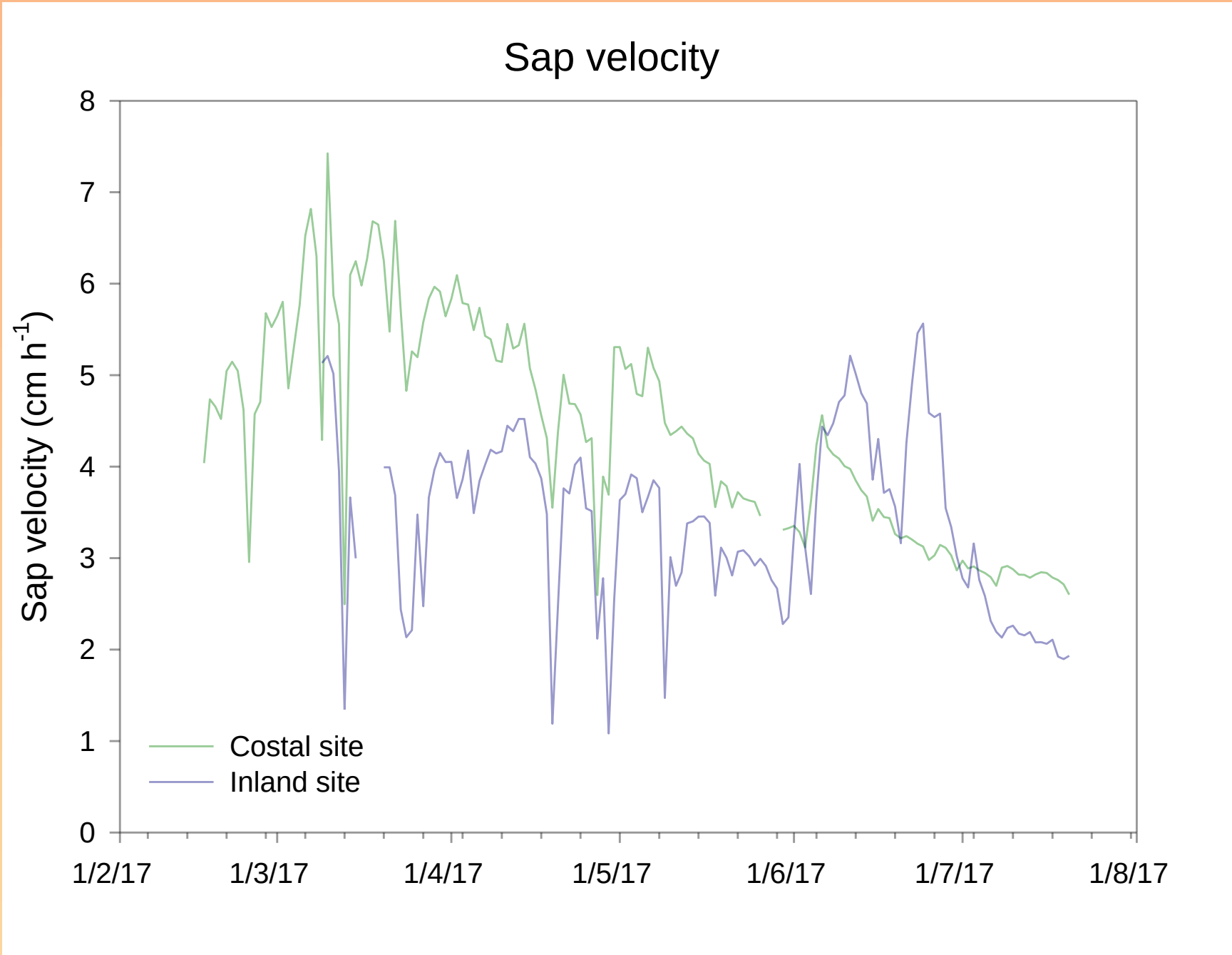
Inland



Tree species: *Pinus halepensis*



	Coast	Inland
Pine density	533 trees·ha ⁻¹	875 trees·ha ⁻¹
Pine diameter average	17,1 cm	19,0 cm



Conclusions

- Plots located in the coastal site displayed higher sap velocity from March to June than that of the inland during the same period
- From June the inland site displayed the highest sap velocity
- Due to higher forest density and thicker trunk diameter, the inland pine forest has an overall higher daily sap flow value from April and onwards
- The difference in transpiration between the sites is attributed to differences in precipitation between the regions in the valley
- As a general pattern, the on-site measurements shows the difference in transpiration between the regions depending on season and geographical location (altitude, distance to the coast, etc.)

ACKNOWLEDGEMENTS

The CEAM Foundation is supported by the Generalitat Valenciana (Spain). This study is partially funded by the Spanish Ministry of Science and Technology, through the research project “VERSUS” – CGL2015-67466-R (MINECO/FEDER) and by the Conselleria de Cultura (Generalitat Valenciana, SPAIN) research project “DESESTRES”-- PROMETEOII/2014/038