

Modern pollen distribution in the Adriatic Sea reflecting river provenance

Salvador Ruiz Soto^a, Karin A.F. Zonneveld^a, Timme Donders^b, Francesca Sangiorgi^b

a MARUM, Fachbereich 5/Geowissenschaften, Department Micropalaeontology/Palaeoceanography, Leobener Straße, D-28359 Bremen Germany.
b University of Utrecht, Faculty of Geosciences, Department of Earth Sciences, Heidelberglaan, NL-3584 Utrecht The Netherlands.

Abstract

Pollen and spores in marine archives are useful to reconstruct past environmental and climate changes as well as anthropogenic activity in the source region. But, to establish adequate reconstructions it is essential to know the associations.

It is well known that pollen and spores observed in marine sediments can have an alluvial or fluviatile origin. However, to date detailed information about the transport and settlement processes in marine environment in the vicinity of river mouths is relatively limited. Here, we present information about these transport and settling processes along the western Adriatic Sea margin.

Aim of the project

1. Determination of the source region of marine sedimentary pollen associations
 2. To identify transport ways of pollen and spores in the Western Adriatic Sea and Gulf of Taranto

Region of study, Core sites

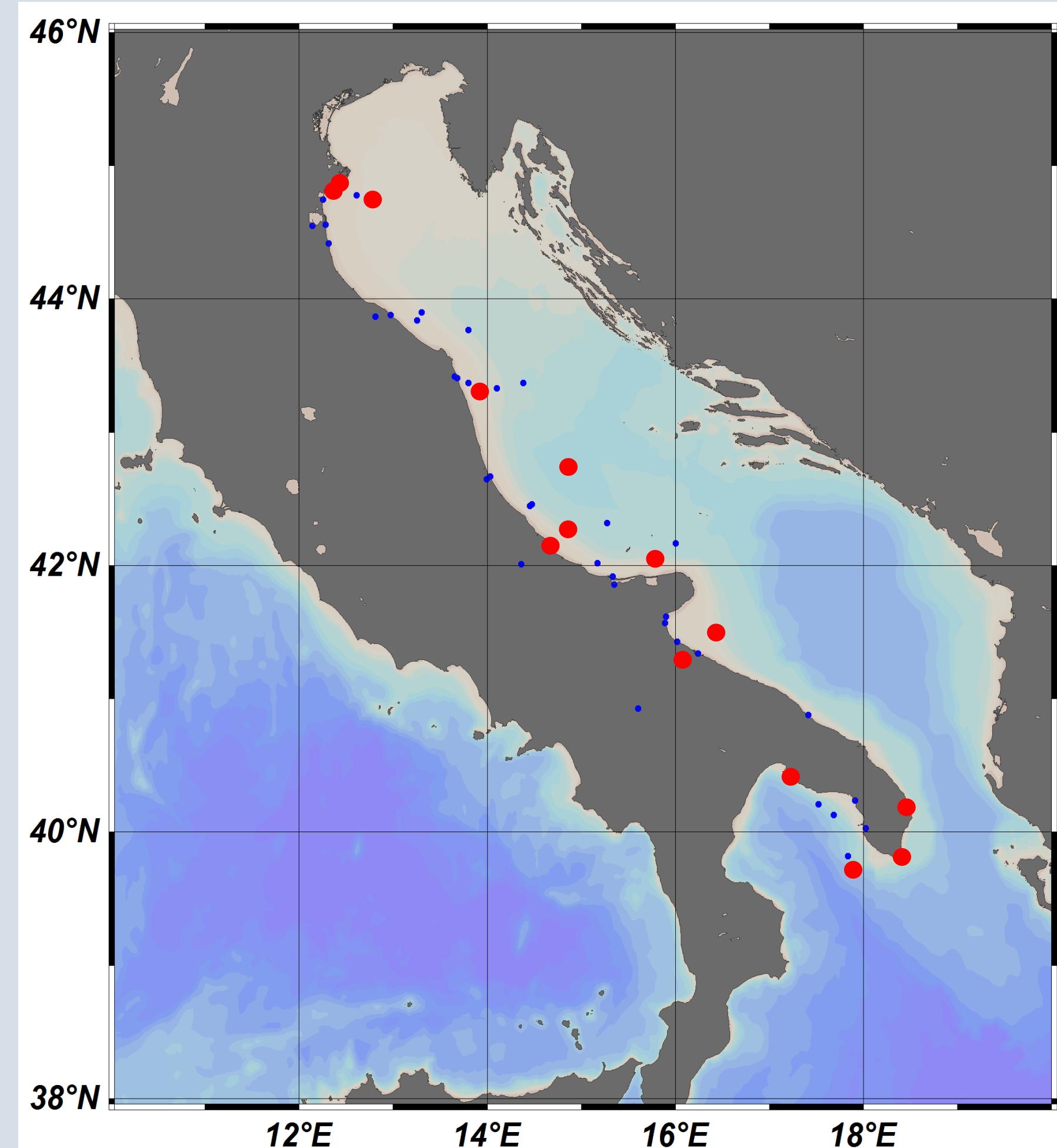


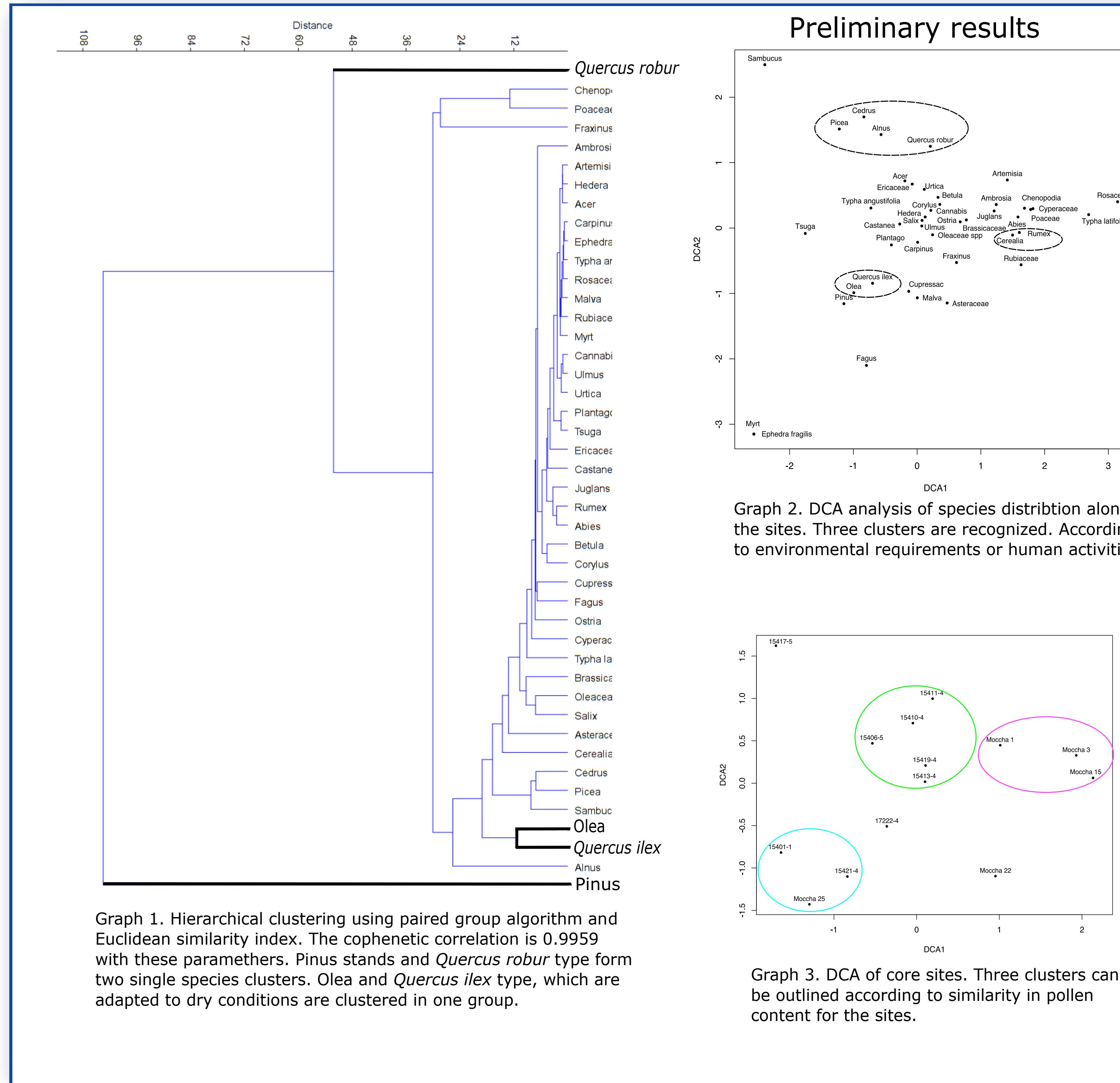
Fig 1. Representation of the core sites along the Italian coast and the Adriatic Sea. Covering the regions between the River Po mouth and the Strait of Taranto. In blue, all the cores available. In red, the cores presented in this poster.

Material and Methods

A set of 50 samples will be studied although 17 samples have been analyzed so far. Samples are from main rivers systems drowning into the Adriatic Sea and marine settings. Comparison of human and fluviatile samples will allow detection of the source region and transport ways of the marine assemblages.

Samples are treated following standard laboratory procedures Faegri, K., and Iversen, J., (1989)[1]. One tablet of Lycopodium was added to each sample in order to calculate palynomorphs concentration. After chemical treatment, samples were sieved through a 10µm nylon mesh. An aliquot of 50µl was homogenized on a mounting slide with glycerin jelly to have permanent slides. Between 1 and 4 slides are analyzed using light microscope at 400x and 1000x magnification for identification.

Pollen grains were identified following Beug, H-J., (2015)[2], Trigo, M., et al. (2008)[3] and the reference collection of the Department of Palynology and Palaeoecology of the University of Utrecht.



Graph 1. Hierarchical clustering using paired group algorithm and Euclidean similarity index. The cophenetic correlation is 0.9959 with these parameters. *Pinus* stands and *Quercus robur* type form two single species clusters. *Olea* and *Quercus ilex* type, which are adapted to dry conditions are clustered in one group.

Results and Discussion

We see three clusters. One cluster coastal, more offshore in North Adriatic and the Gulf of Taranto. Other cluster more river-coastal and one in-shore. The results do not show a clear gradient along the coast or between the coast and the rivers

The number of pollen grains counted per site should be at least 200 pollen grains per sample as suggested by Margaritelli, G., et al (2016) [5]. However, according to the data shown in Fig 2, it is possible to see a slightly transport signal along the coast, close to the shore and one off-shore. This must be in response to transport and not to local vegetation as there are three main regional areas with different climate and so vegetation predominance: north Adriatic, middle Adriatic and south Adriatic.

Pinus, a long distance transport pollen [6] appears alone in the hierarchical clustering and in the center of the DCA for species, establishing this as an external group with no site preference.

Conclusion and Outlook

We have examined a set of 17 slides from different sites, including rivers, lakes, beaches and the Italian Adriatic coast. But, according to the data we have, it is still soon to try to elucidate species associations, sea-land or human-vegetation correlations. But we can extract some general information from this preliminary approach.

In order to get a broad view of the region only one slide per site was counted and in some of them the total amount was below 200 pollen grains per slide with some of them completely empty. More slides, up to 4 when needed, will be used to try to see at least 200 pollen grains per site so the data can be solid enough to perform data analysis.

For the rest of the groups more countings need to be done for more accurate statements.

References

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Plots done with R-Studio (vegan package),
hierarchical clustering using Past 3 and map

Using Ocean Data View 4.
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