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Seasonal variations of morphological and sedimentological characteristics of some beaches in the northern Latium coastal area (Italy).

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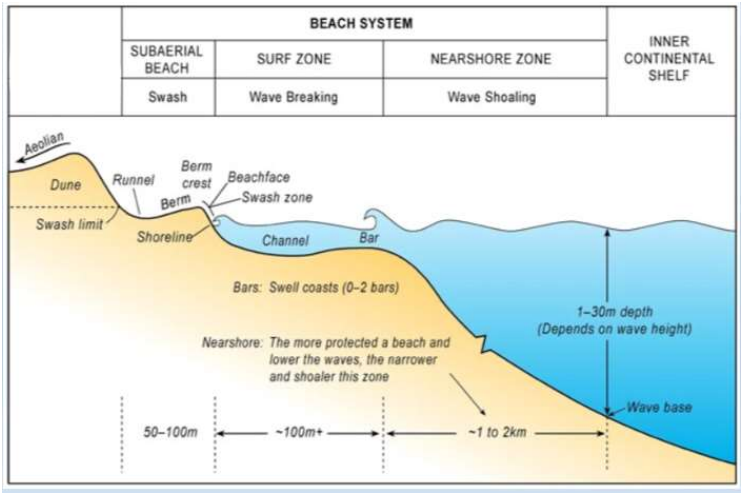
…….WHY THE COAST?

- The coast is the “hinge” between two environments: the continental shelf and the emerged lands.
- It is strongly dynamic, as a result of the differential action of the marine weather forcings on the geomorphological structures.

COASTAL USES VS CULTURAL AND ENVIRONMENTAL VALUES

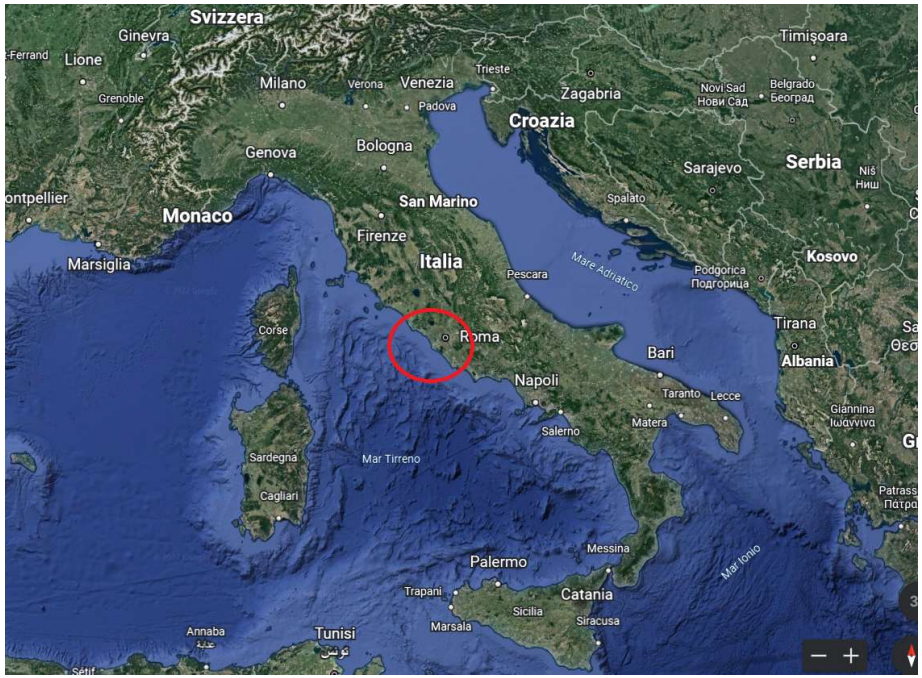
- It has a fundamental ecological and biological role but at the same time, it is home to many industrial activities. The spatial overlap of very different and sometimes incompatible coastal uses often causes damage to habitats and ecological communities.

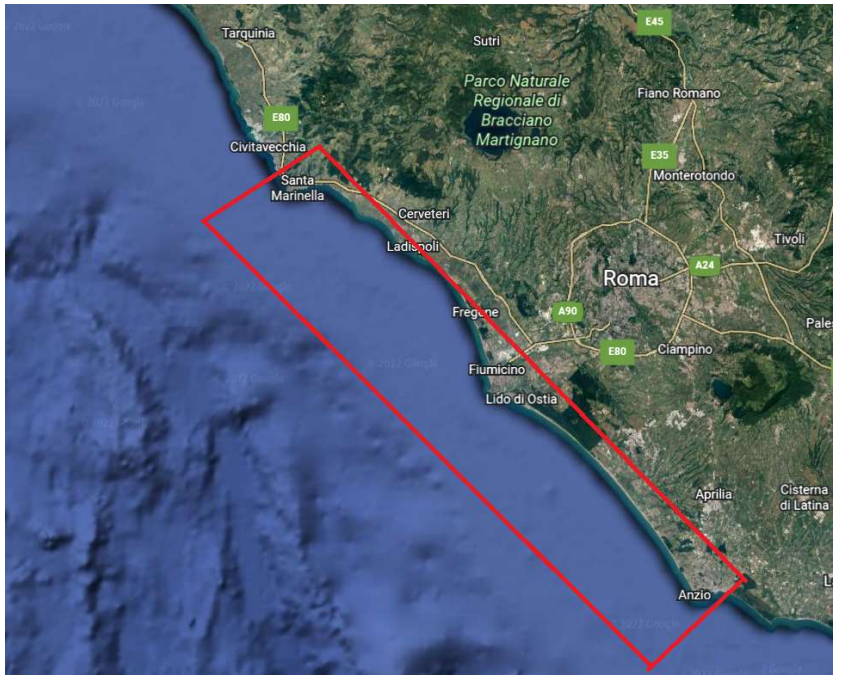


- Threats such as habitat loss, alteration of the supply of sediments, excessive pollution, the introduction of alien species, climate changes, coastal works make the coast a highly endangered environment.

THIS WORK

- Study of the physical (morphological and sedimentological) characteristics of four dry beaches included in the Physiographic Unit (PU) Capo Linaro - Capo Anzio (Latium, Italy).





- We focus on this PU because is an area strongly anthropized, with strong erosion processes and few coastal areas with a natural morphology and aspect.
- Moreover, the PU could be affected in the next few years by the construction of a new commercial harbor. Coastal works could influence the natural dynamic.

THIS WORK

- From the dune to the shoreline, between winter and summer (2 transects in each beach, 3 sediment sampling points, 6 sediment samples in each transect).
- The beaches have a morphology relatively undisturbed by human action.
- To acquire useful data for the analysis of the sedimentary balance and the seasonal evolution of the shoreline.

Campo di Mare

Passoscuro

Focene

Ostia

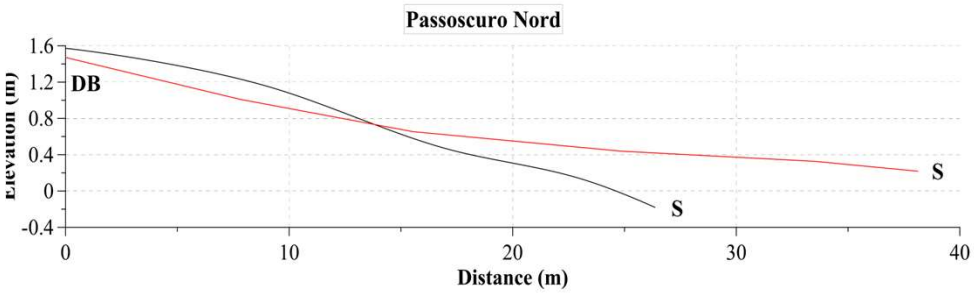
- The sedimentological characteristics were examined by analyzing sediment samples, while volumetric variation between the winter and summer seasons were obtained using two distinct methods: a graphical reconstruction of the trend of the beach profile and a mathematical-analytical methodology.

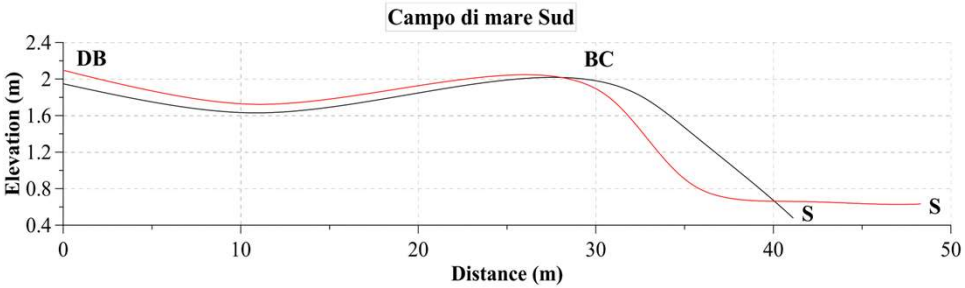
SOME RESULTS

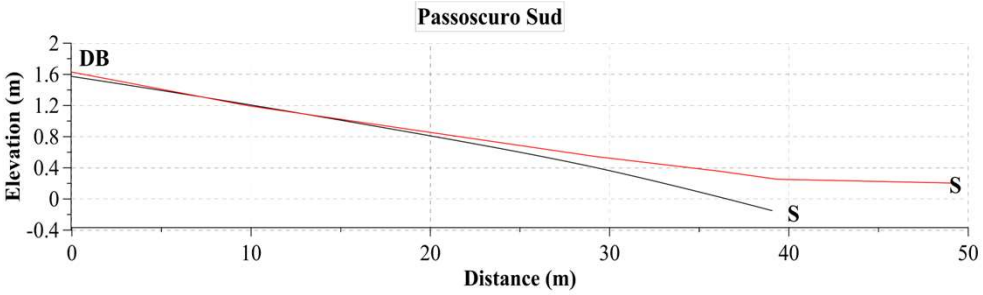
Passoscuro and Campo di Mare dry beach morphology

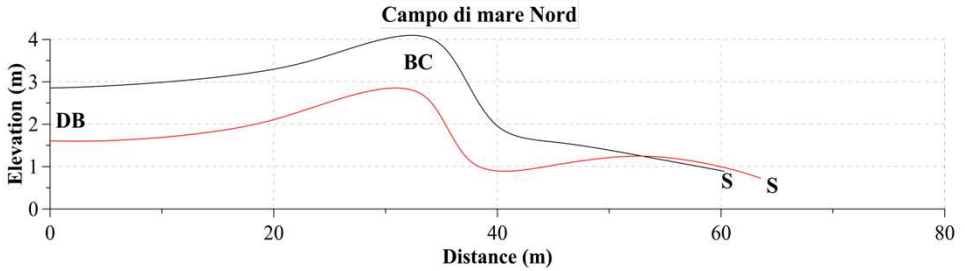
Dune base - DB
Shoreline – S
Berm crest -BC

SUMMER 2021
WINTER 2021









- From winter to the summer, lowering of the topographical altitudes of the beach and extension of the same by about 10 meters

- SUD: From winter to the summer, lowering of the topographical altitudes of the beach and extension of the same by about 10 meters
- NORD: marked variations in the morphology of the beach. The storm berm which is evident in winter, is less pronounced during summer. The final stretch of the beach, due to the displacement of the river mouth, shows a different shape.

SOME RESULTS

Passoscuro and Campo di Mare dry beach sediment grain sizes

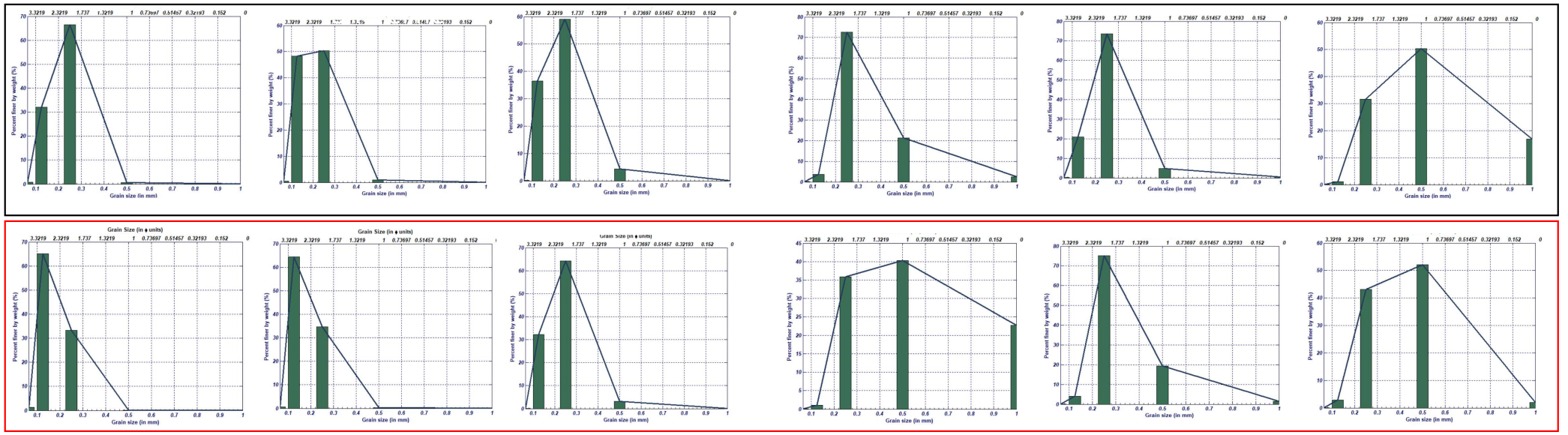
SUMMER 2021
WINTER 2021

Passoscuro

Dune base | **Storm berm** | **Shoreline**

Campo di Mare

Dune base | **Storm berm** | **Shoreline**



- In general dune with higher percentages of fine sand. Medium sand along the berm and shoreline.
- Textural variations were observed between the summer and winter periods, but these variations are not isolated in single slope breaks and occur along with the entire morphological profile.

SOME RESULTS

Beach volume variations

The seasonal variations of the beach volume were analyzed with the two methods described above: graphical and mathematical. Below are the values obtained for each winter and summer beach profile, and the percentage difference in seasonal volume, calculated with the two methods mentioned.

Beach profile	WINTER Graphic method	SUMMER Graphic method	Differences	WINTER Mat. method	SUMMER Mat. method	Differences
Passoscuro Sud	37.2m³	26.8m³	27.9%	36.9m³	26.8m³	27.4%
Passoscuro Nord	25.6m³	17.3m³	32.4%	25.7m³	17.4m³	32.3%
Campo di Mare Sud	46.4m³	40.2m³	13.4%	49.5m³	43.3m³	12.5%
Campo di Mare Nord	106.3m³	75.2m³	29.3%	103.5m³	77.3m³	25.3%

Minor differences between the two methods are visible only in the beaches with a more articulated morphological profile, such as the case of Campo di Mare. The comparison of the two methods gives a coefficient of determination of 0.9.

CONCLUSIONS

• During summer, the morphological profiles show a less articulated structure than in the winter period.

• During summer, a lengthening of the beach profile occurs, generally accompanied by a limited decrease in the topographical share of dune base.

• Regarding grain sizes, textural variations were observed between the summer and winter periods. These variations, where present, are not isolated in single slope breaks, but occur along the entire morphological profile.

• The analytical method for the volumetric calculation is reliable above all in poorly articulated topographical situations (discrepancies with the cad method of less than 2%).

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THANK YOU FOR YOUR ATTENTION