

# The Pleistocene coralligenous build-ups of Le Castella and Capo Colonna terraces (Calabria, Southern Italy).

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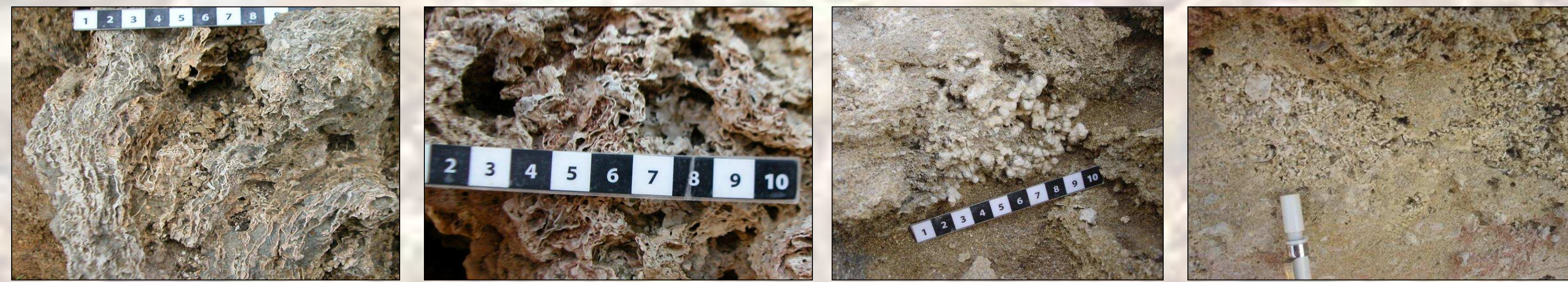
## INTRODUCTION

Autochthonous coralligenous build-ups mainly formed by encrusting coralline algae, currently develop on Mediterranean hard and soft bottoms with a patchy distribution along the coast.

However, few fossil examples have been described in the literature and their evolution in the context of a stratigraphic cycle has seldom been modelled in detail (Basso et al., 2007; Titschack et al., 2008).

## MATERIALS AND METHODS

11 stratigraphic sections in both terraces have been measured and sampled. 120 thin sections have been prepared for red algae identification and to measure the diagnostic anatomical microfeatures of the algal thalli for statistical analysis. Sandstone and grainstone associated to build-ups have been disgregated in order to separate particles in a conservative way and conduct paleontological analysis of the algal fragments forming the sediment.



## GEOLOGICAL SETTING

Wide marine terraces are preserved in the area of the Crotone peninsula, Ionian Calabria, southern Italy (Figs. 1-2) (Zecchin et al., 2004; Nalin et al., 2006, 2009).

The deposits are up to 10 m thick and consist of mixed carbonate and siliciclastic sediments, in which coralligenous build-ups and other red algal facies are dominant.

The two youngest marine terraces are related to Marine Isotope Stage (MIS) 3 and 5.1 (Gliozzi, 1987; Belluomini et al., 1988; Palmentola et al., 1990; Mauz & Hassler, 2000; Zecchin et al., 2004). The MIS 3 terrace outcrops in the area of Le Castella, S of Isola di Capo Rizzuto village, whereas the MIS 5.1 is located along the Capo Colonna cape, in the NE sector of the peninsula (Fig. 2)

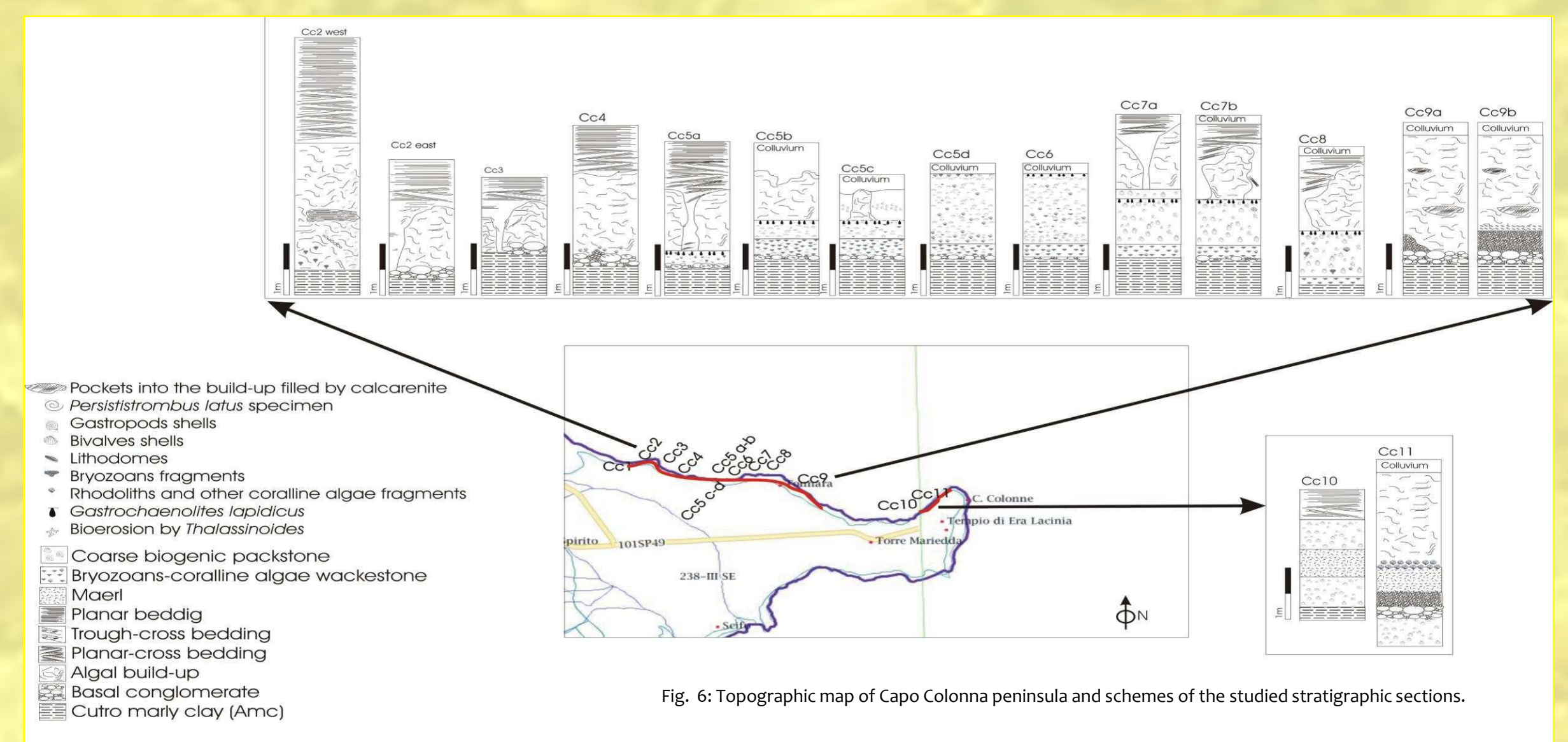
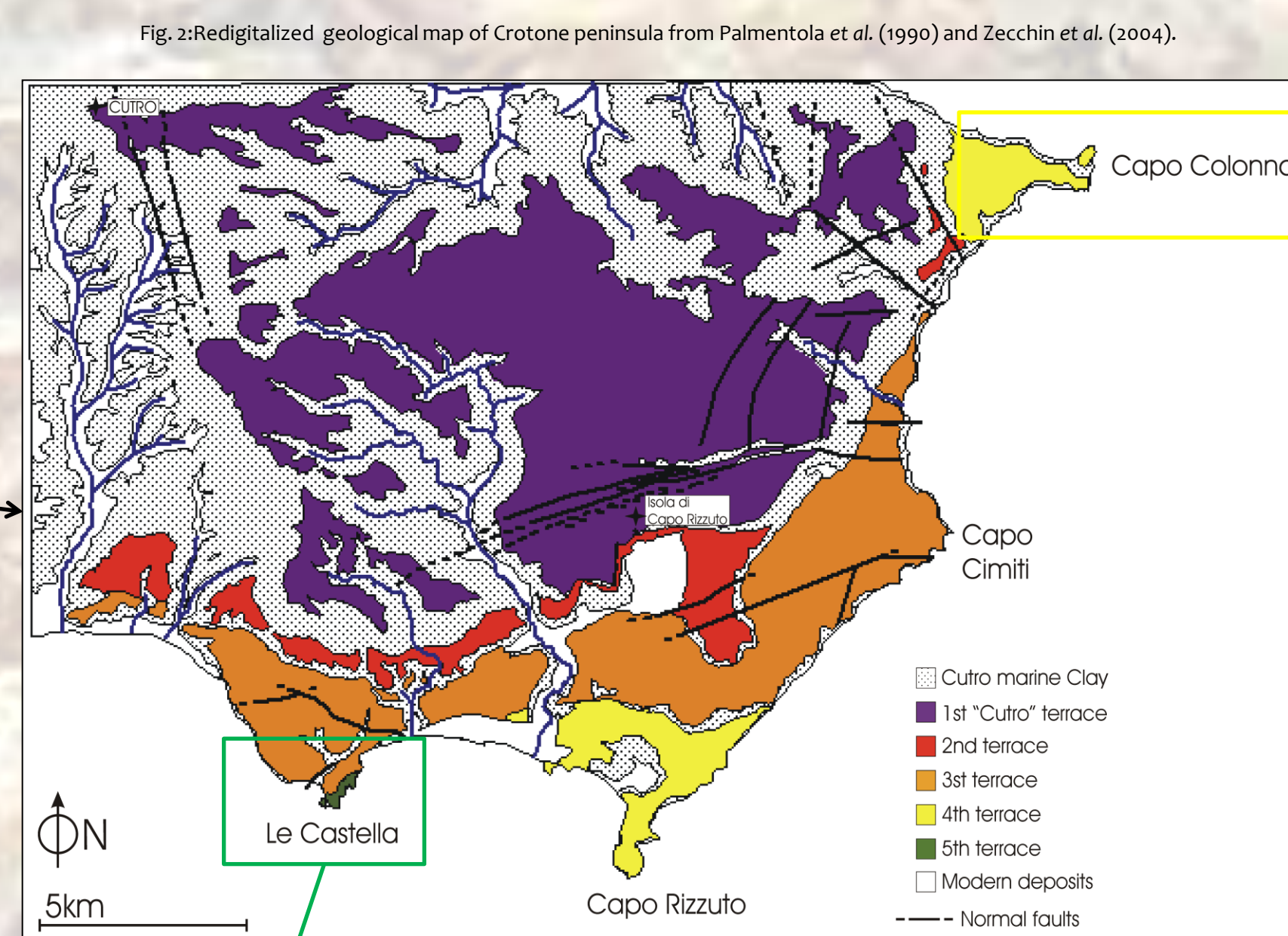
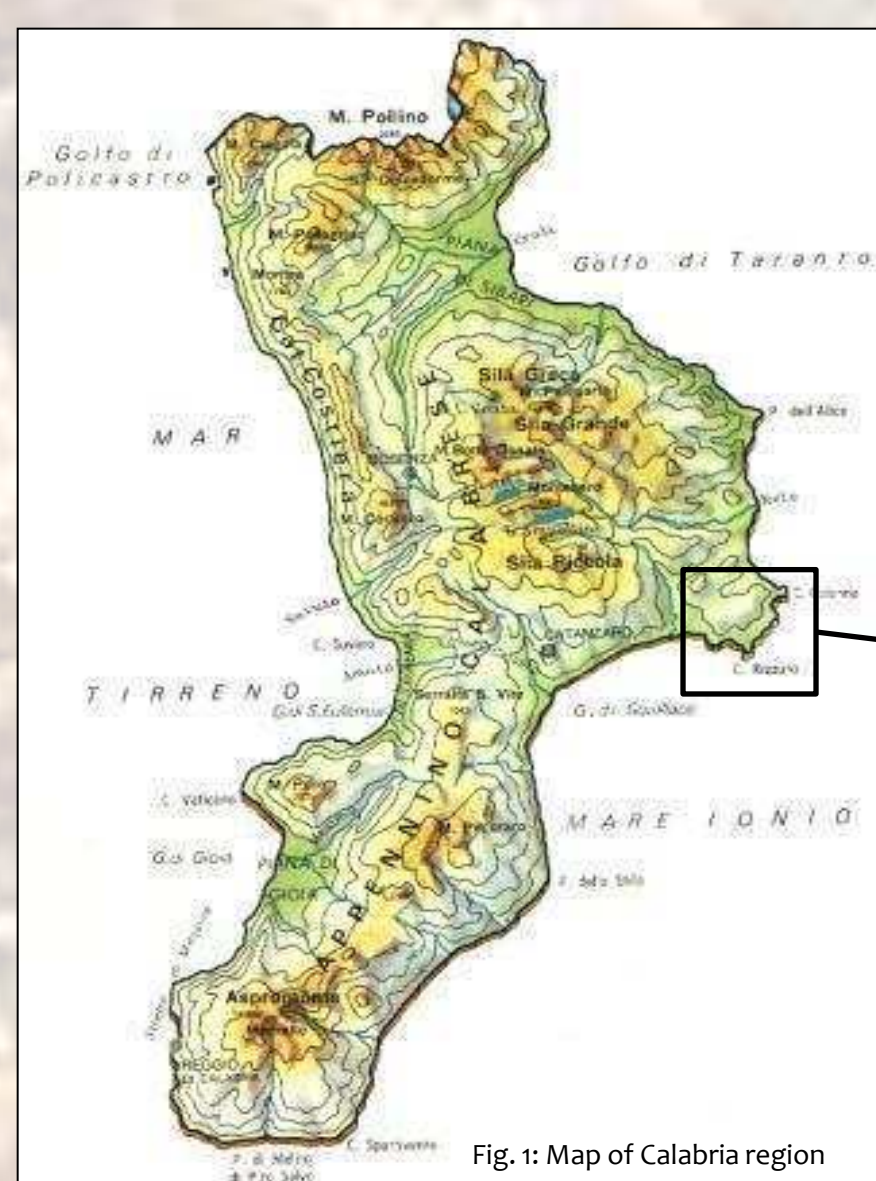
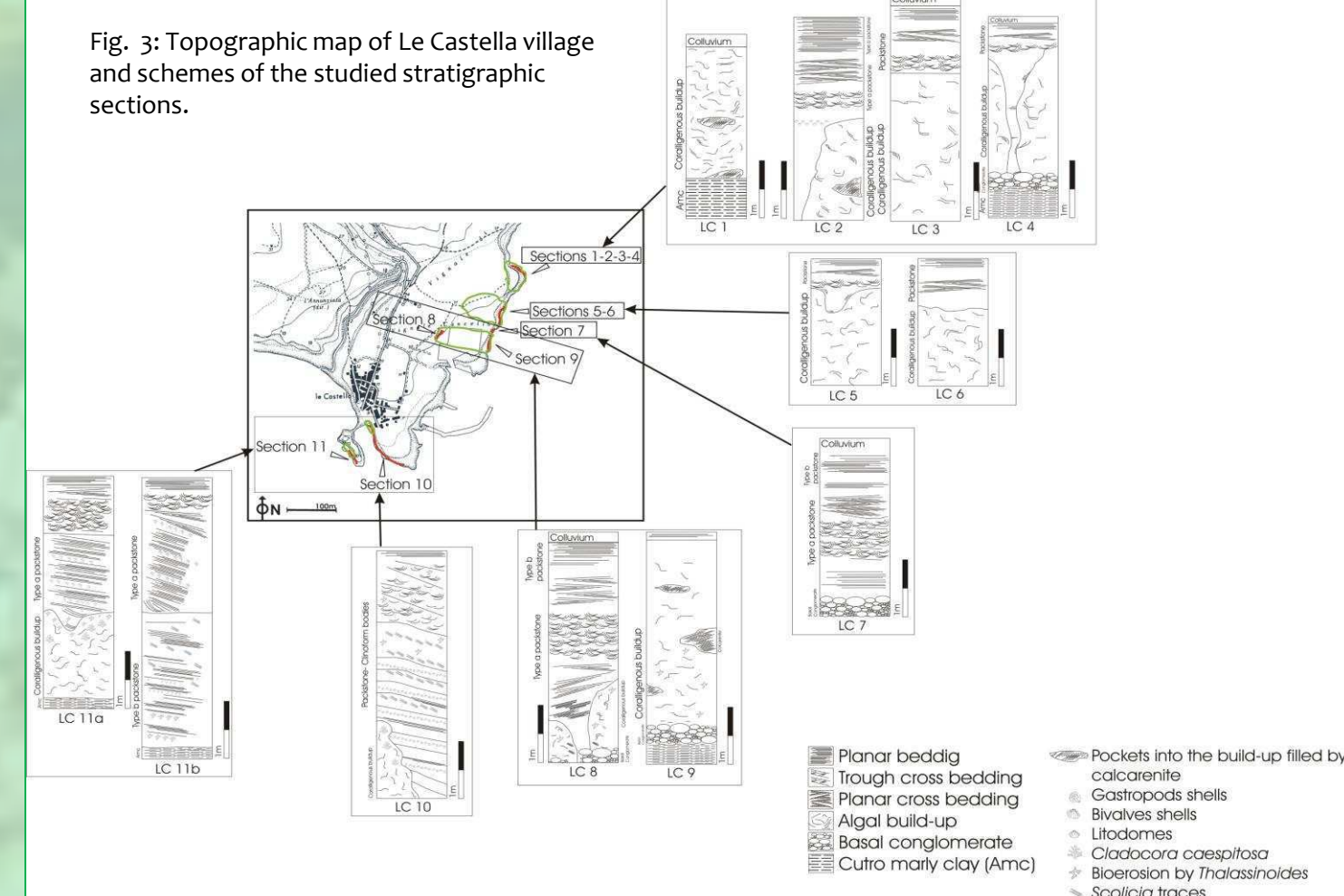


Fig. 3: Topographic map of Le Castella village and schemes of the studied stratigraphic sections.



The algal reef characterizes the lower interval of all the stratigraphic sections (Fig. 3). In particular 4 main algal build-ups have been recognized on the basis of the studied sections. The build-ups range between 1 and 3 m thick, with lateral continuity of several meters (10 m), forming continuous banks.

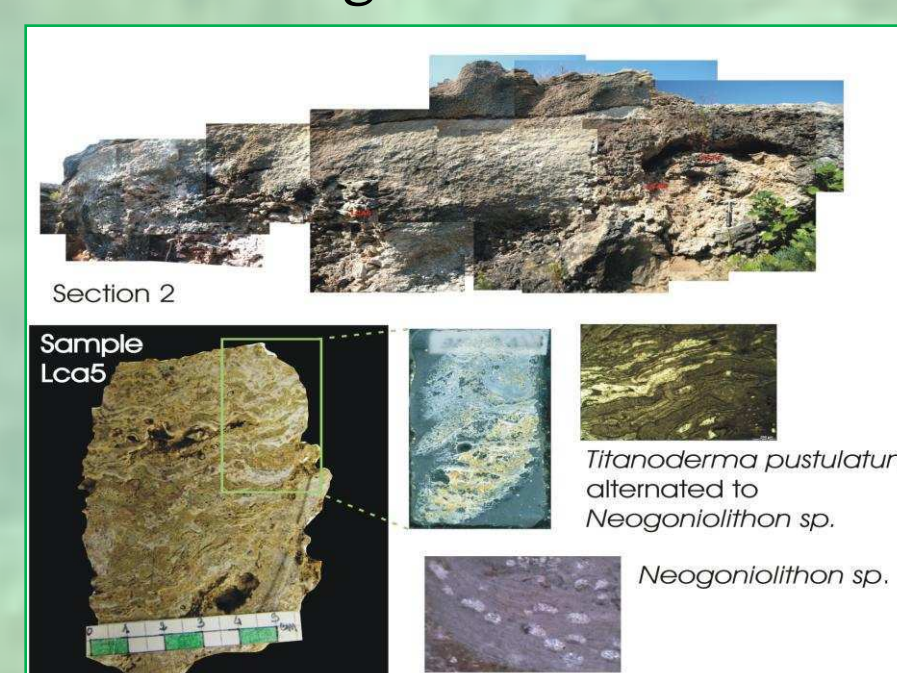


Fig. 4: Pictures of section 2, samples LC45, thin section and details with identified algae species.

### Dominant red algae species:

*Mesophyllum alternans* (Foslie) Cabioch & Mendoza 1998



Asexual conceptacles into the perithallus of *M. alternans* crusts.



*Titanoderma pustulatum* (J.V.Lamouroux) Nägeli in Nägeli & Cramer 1858

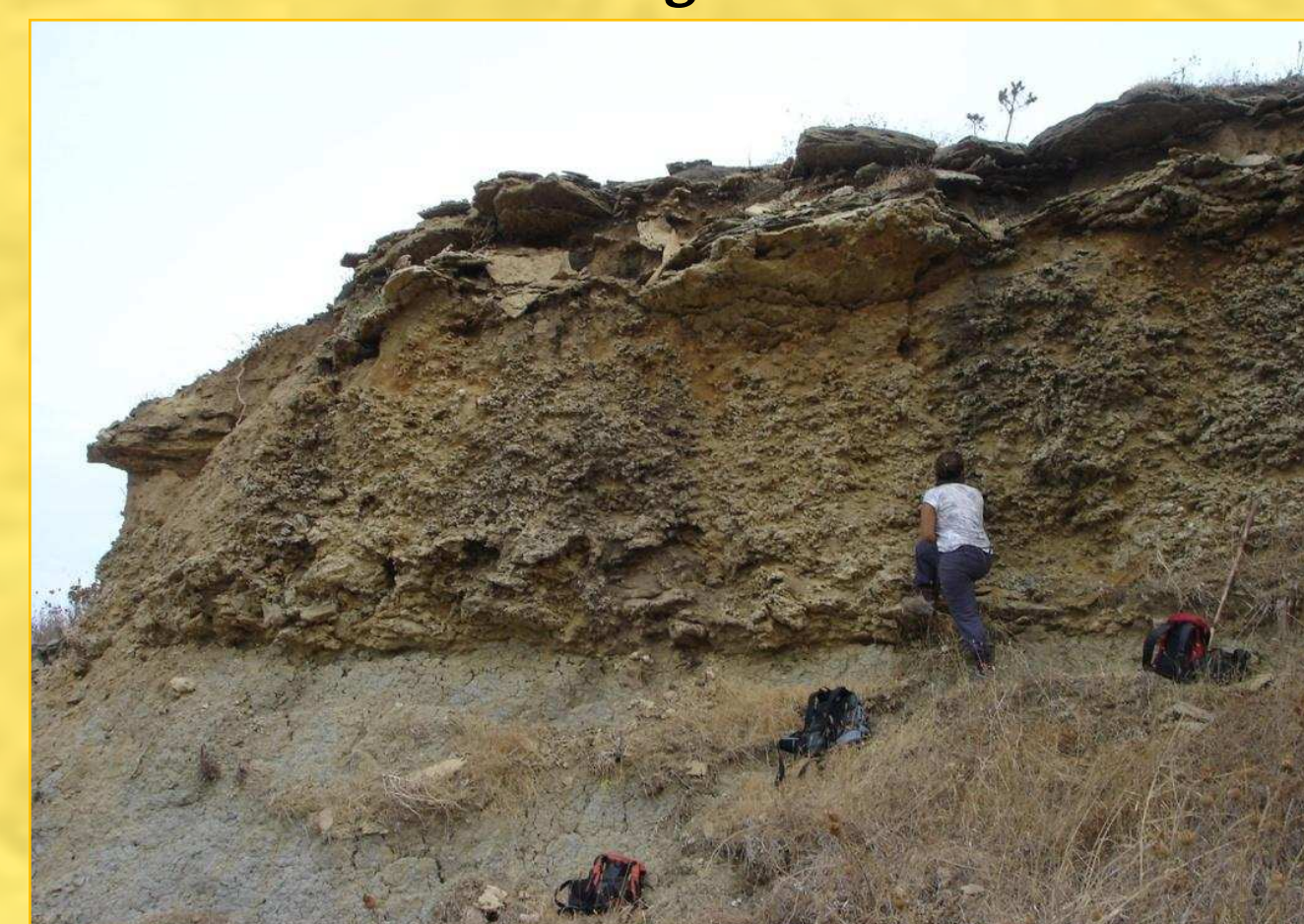
Often encrusting other algae or shell fragments.

This facies is characterized by a crustose red algae-dominated structure. The framework is dense, compact and shows a leafy fabric, usually with high frequency of algal crusts, in which a patchwork of corallines occurs, with plant overgrowing or being overgrown by neighbours.

...and *Mesophyllum expansum* (Philippi) Cabioch & Mendoza 2003  
*Mesophyllum* sp., *Phymatolithon* sp., *Lithophyllum* sp., *Titanoderma* sp., *Amphiroa* sp.

The deposits of Capo Colonna marine terrace are characterized by algal build-ups growing over the basal conglomerate or, alternatively, over the hardground forming at the top of packstone, or over rhodoliths beds (Fig. 6). Moreover, prälines rhodoliths and maërl bed also occur at Capo Colonna.

### Red algal reef



Separate algal build-ups, 1-3 m thick and 4 m long, and algal reef banks, 4 m thick and more than 40 m long. The algal bioconstruction shows a leafy growth structure. Throughout the algal reef facies, the red algal assemblage is dominated by: *M. alternans*, *Lithophyllum* sp., *P. calcareum* and *M. expansum*.

### Rhodoliths and maërl beds

Branching rhodoliths are present sparsely into the packstone in sections CC5d and CC6. These rhodoliths are formed primarily by *M. alternans* and *T. pustulatum*. The nucleus of rhodoliths is characterized by fragments, both part of older bioconstructed bodies, and siliciclastic cobbles.



Abraded branching rhodoliths are present also in section CC11, at the base of the algal build-up. These rhodoliths are completely integrated into the above bioconstruction and are formed mostly by *Lithothamnion* sp.



Section 11 shows a well developed maërl bed (40 cm thick). The branches are at maximum 2 cm long, and 0,5 mm thick. A fine matrix lithified the branches. Maërl is formed by *Lithothamnion corallioides* (P.L.Crouan & H.M.Crouan) P.L.Crouan & H.M.Crouan 1867, *Lithothamnion* sp., *Lithophyllum* sp. and *Phymatolithon* sp.



Thin section of *L. corallioides* free branch

## DISCUSSION AND CONCLUSIONS

The two most recent warm Pleistocene Marine Isotope Stages have been both characterized by a well developed and active carbonate factory in the area of Isola di Capo Rizzuto. Calcareous red algae represents the most important carbonate producer, showing a high floral biodiversity able to produce different facies within the deposits.

Le Castella marine terrace deposits are characterized by algal build-ups developed in shallow water (15-30 m) and dominated by *M. alternans* and *T. pustulatum*.

Capo Colonna marine terrace deposits are more heterogeneous, showing both algal build-ups and banks, dominated by *M. alternans*, *P. calcareum* and *M. expansum*. The prälines facies as well as maërl bed are typically circalittoral in the present-day Mediterranean.

Prälines are formed by *M. alternans*, *T. pustulatum* and *Lithothamnion* sp.; maërl is dominated by *L. corallioides*, *Phymatolithon* sp. and *Lithothamnion* sp. Further analyses on coralline algae and other biogenic producers are in progress in order to describe the major features of these Pleistocene carbonate factories.

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