Coastal Instability and Urban Changes - the Case of the Nessebar Peninsula

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The Nessebar Peninsula has a narrow and elongated shape located at the northern part of the Bourgas lowland at the west Black Sea coast. One of strongest factors forming out its coasts is the destructive activity of the sea waves. During the last two and a half milleniums the urbanization and constructive works on the peninsula envisaged a free of flooding strap up to several dozens of meters for protection from the destructive power of the storm waves. In a stagnating sea level and in a protected sea basin, the fortification works are situated along the sea and even enter it. The *diateikhisms* of the classical and late antique fortifications of Mesambria in the northern and southern bay had probably also harbor functions, while the pre-Roman arch-like wall in front of the fifth isobath in the southeastern bay reflects the tradition to closely "follow" the sea. An immediate proximity to the water basin is evident from constructions directly on the rock ground. This is the case with the pre-Roman trapezoid wall in the northeastern zone of the peninsula or with the pilot fortification of the bases and the substructions of the late antique wall in the southeastern bay. A much more disruptive effect upon the coastal zone has the destructive impact of the waves in the periods of transgressive rising of the sea level. In the southeastern coastal zone, the localization of the early Thracian and of the classical Dorian fortification in the zone of the fifth-fourth isobath, presumably sets the lower mark of the variation of the water level in the 12^{th}-5^{th} centuries BC up to a depth of 5-7 m. The rise of the sea level in the 1^{st} millenium AD imposed the displacement of the fortifications onto higher terrain. Walls erected in the 5^{th} c. AD in *opus mixtum* are discovered in the southeastern bay in front of the second isobath. In the middle and the second half of the second millenium the waves scraped niches in the cliff slopes of the peninsula. The overhanging land layers fell down together with the fortification works and public buildings on the head of the peninsula. Next to the late antique fortification wall, dropped in the southeastern bay, the northern part of the church of "The Mother of God Eleousa" fell into the sea before 1341/42, and also the church "St. Protomartyr Stephen" fell during the earthquake in 1855. The same happened up to the beginning of the 18^{th} c. to the Dorian temenos of Zeus and Hera, to the theatre of the antique city and the early Christian basilica that has been topographically inherited by the church "St. George the Old" in 1704. After the transport of the abradant mass by the coastal sea currents a slightly sloped terrace formed out. In the northeastern zone of the peninsula after the submergence of the rock coast up to the end of the 20^{th} c. a strap has been abraded. It is some 15-25 m wide and lies between the trapezoid hellenic wall and the basilica "Mother of God Eleousa". At the southeastern coast between the church "St. George the Old" and the late antique wall the peninsula lost at least 70 m wide strap. Most intensive is the coastal erosion to the east. There, some 240-250 m from the fortified Dorian settlement submerged. At the end of the 20^{th} c. the peninsula has a specific shape with narrow and elongated bays and outreaching capes. After the construction of the multifunctional structures for coastal protection the three-millenium-old cultural heritage of Nessebar is preserved for the future.

Upper Cretaceous silicites from the Bohemian Cretaceous Basin (Czech Republic) as a versatile building material

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Bohemian Cretaceous Basin extends over 15,000 km^2 and makes the largest sedimentary unit of the Bohemian Massif (Czech Republic). Its lithology is characterized by