important temple was discovered in another location nearby. According to archaeological evidence, the settlement was active in classical and Hellenistic times, and sporadically afterwards. It was a rural settlement and numerous finds indicate at least three successive layers of buildings with stone foundations criss-crossing one another with no particular pattern.

The foundations of the buildings and the surrounding environs show many signs of episodic deformation, either direct or indirect. The most obvious cases are:

A surface rupture cutting through at least two foundations. It has a heave of up to 3 cm and a slight normal displacement.

Several basal walls and foundations have been found tilted and deformed. Tilting is as high as 30^o off vertical.

A small temple that is located just outside the settlement shows signs of sudden destruction: roof tiles are being found in and around the temple. They are roughly retaining the space that they had on the roof, which is an indication that the wooden roof collapsed. Also, one of the entrance pillars seems displaced both vertically as well as left-laterally. This displacement vector is compatible with the general fault displacement vector in the area.

An artificial cross-section at the stream that bisects the settlement shows an exposure of a normal fault system that deforms a series of paleoseoils and runs through the settlement, parallel to the main fault. Paleoseismological analysis of the cross-section shows that this fault system was not active in historical times, although the southwesternmost strand of the system roughly coincides with the surface rupture.

The position of the settlement on a rather steep slope, as well as the nature of finds, indicate a severe topographical amplification of the effects. Nevertheless, we believe that the primary deformational cause was faulting, evidence of which has been found in the cross-section that was consequently amplified by gravitational effects.

Urban paleoseismology: case studies from Thessaloniki, Greece

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Faults in urban areas pose a real danger for buildings and infrastructures, not only in the case of an earthquake, but also in such cases as differential sediment compaction, water overpumping, etc. Their importance is often underestimated with sometimes severe consequences.

Detection of faults is not easy in urban environments, as usually outcrops have been covered by built structures, prohibiting direct observations. Geophysical surveys are rare, but even in those cases the exact location of a surface-intercepting fault is not clear.

One of the most promising methods for acquiring quantitative information about faults in urban areas is paleoseismological investigation. It consists of an integrated set of methodologies that can provide hands-on data for displacement, timing, etc. In this paper we present two cases of paleoseismological applications in the metropolitan area of Thessaloniki. Two faults, one evident and one unknown, have been studied in Peraia and Kalamaria respectively.

Peraia fault: This fault defines the contact between the footwall Pliocene sandstone-marl series and the hangingwall loose Holocene deposits. It is a fault that coincides with the well known Anthemountas fault zone, a roughly E-W trending normal fault zone that is associated with several historical earthquakes. Its exact location through Peraia town was not known in much detail due to the lack of outcrops. Nevertheless, it forms a well defined scarp that divides the town into an upper (Ano) and lower (Kato) part. In 2005 and 2006 a set of surface ruptures along this fault caused significant damage on buildings and roads. Paleoseismological investigation with two trenches along the fault showed that faulting was not random, as a large displacement was detected, with successive steps of cumulative faulting. Borehole data confirmed that the total displacement was indeed large (35 m). Trenching showed that the fault has been continuously active during the Quaternary, with all of its displacement on the same surface, posing thus a severe danger for the area in general and specifically for the buildings that are built along its trace. The 2005-06 surface ruptures are interpreted as a combination of overpumping, compaction and fault creep. The contribution of each factor is not possible to be calculated, as there are too many uncertainties concerning the deformation model.

Kalamaria fault: This fault was exposed during the construction of a multi-stored residence building in Kalamaria, a town located next to Thessaloniki city. This fault is displacing marls and a paleosoil that is located on top of the sedimentary sequence. Morphologically it is manifested as a gentle scarp, observable in roads that cut through the fault along at least 500 m. Paleoseismological analysis showed that the fault has been inactive during Upper Pleistocene – Holocene as there are no indications for recent reactivations. However, the existence of the morphological scarp suggests that it has probably been active during that period, but microstratigraphical evidence for this activity has been destroyed by anthropogenic factors. Even if it is not active, the fault zone exists and it can act as a weakness zone during a distant earthquake or in response to water level fluctuations.

In conclusion, paleoseismological techniques can be of great effectiveness in the study of urban faults, either active or not. Planners should take into account this methodology, because it can greatly enhance the understanding of ground response in abnormal conditions.

A proposed methodology for coastal risk management

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Coastal erosion is a gradual process that alters the distribution of sediments and modifies the geomorphology of the coasts. It may result in the destruction of natural coastal defences (sand dunes, cliffs, etc) and the increase in land instability which may in turn result in flooding of the hinterland and landsliding of coastal areas with steep slopes and unstable materials. The damages induced by such hazards include loss of life, property, infrastructure, and land. The costs of emergency action, remediation and prevention can often represent a significant burden to the communities affected and to national governments. According to predictions, climate change impacts, including sea-level rise and extreme weather patterns, will lead to the increase in the frequency and intensity of such hazards. Risk-based decision-making is seen to provide the means of addressing the challenges put forward by climate change. The complexity and interrelation of the processes acting on coastal locations call for an integrated framework for the assessment of coastal risks and the identification of the appropriate measures for the prevention and reduction of erosion, flood, and landslide risks. In this paper, existing models for the mapping of pressures on coasts and current development practices and tools will be reviewed, before a holistic methodology is proposed in order to assist decision-makers in effective coastal risk management.

Paleocene-Eocene migmatites in the Bulgarian Rhodope revisited

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Migmatites of proved Paleocene-Eocene age are widespread in several tectonic units of the Rhodope metamorphic complex (RMC). Most of the migmatitic unit precursors consist of orthogneisses. These were predominately felsic rocks of granite to granodiorite and diorite composition of late-Paleozoic (Arda unit) and late-Jurassic protolith ages (Madan, Startsevo, and Chepinska unit). Zones of post-anatectic extension outline the unit boundaries obscuring the melt-in isograd in the RMC. The peak metamorphic conditions correspond to kyanite-