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Evolution of an active mountainfront analyzed through palaeosols

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The Apennine fringe lies between the southern edge of the Po Basin, a wide syntectonic trench, and the uplifting Apennine chain. The fringe is marked by a series of dissected surfaces, underlain by alluvial fan and floodplain deposits. On these surfaces, thick sequences of well developed complex soils are found (Busacca and Cremaschi, 1998; Cremaschi, 1987). The soils were mapped by the Soil Service at different scales (1:50.000 and 1:250.000) since the ‘80s. Starting from 1993, morphostratigraphic units were focused, within the Margin, by the geological maps of Regione Emilia-Romagna (RER), produced at 1:50.000 scale by the Geological, Seismic and Soil Service. These units were mapped and correlated all along the Apennine fringe as Unconformity Bound Stratigraphic Units (UBSU). Establishment and correlation of UBSU makes extensive use of soil data, which are part of the features used to define non depositional surfaces and then unconformal boundaries. Problems generated in correlation of pedological and geological data fostered a general revision of the genesis and landscape distribution of the most typical soils in the Apennine Margin, to re-assess their palaeoenvironmental and chronostratigraphical significance. This investigation included not only detail analysis of representative observations, but also the complete re-evaluation of the RER soil data base, where about 2000 soil observations are stored for this area. Highly complex morphological properties and horizon sequences within these soils prompted extensive use of micromorphology, to better clarify polycyclic pedogeneses and relations between horizons. Micromorphological

investigations quite often pointed out a lack of any clear genetic relationship between adjacent horizons, suggesting that they correspond, instead, to distinct sedimentary layers. We interpreted several features as originated by overprinting of different processes, part of which, especially mottling, may have taken place after shallow burial. In order to overtake inconsistencies in palaeoenvironmental and chronostratigraphical significance, Optically Stimulated Luminescence (OSL) dating was performed on 15 samples from 4 selected profiles, in two different fluvial basins. The results indicated fairly younger ages than previously estimated, ranging from 135 to 38 ky BP. Such results were in good agreement with both the overall stratigraphic framework and with Martini et al. (2001). Also, distribution of dates within profiles clearly supported the interpretation of these soils as accretionary in nature. A heavy clay level is present in some of the pedocomplexes, and it is now correlated and dated as Upper Pleistocene in time; presence of such a sediment, burying quite soils of only slightly older age, requested the development of a completely new model for the development of alluvial fan surfaces. A model is then proposed, according to which fan surfaces streaming major thrust fronts may be subjected to relative subsidence and become depositional areas, even after an initial dissection event. Busacca, A.; Cremaschi, M. 1998. The role of time versus climate in the formation of deep soils of the Apennine fringe of the Po valley, Italy. Quaternary Int. 51/52: 95-107. Cremaschi, M. 1987. Paleosols and vetusols in the Central Po plain (Northern Italy). UNICOPLI, Milan, Italy; 306 pp. Martini, M; Sibilia, E; Croci, S; Cremaschi, M. 2001. Thermoluminescence (TL) dating of burnt flints: problems, perspectives and some examples of application. J. of Cultural Heritage 2, 179-190.