

ESTIMATION OF REGIONAL CLIMATE CHANGE TAKING INTO ACCOUNT RCP SCENARIOS

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Keywords: med-cordex domain, precipitation, regional climate modelling, temperature

Abstract: Our research group is participating in the Med-CORDEX international initiative with the specific aim of contributing to the complex regional climate modelling database with RegCM4.3 experiments at 50 km horizontal resolution. RegCM is a 3-dimensional, sigma-coordinate, primitive equation model, originally developed by Giorgi et al. Currently, it is available from the ICTP (Abdus Salam International Centre for Theoretical Physics). Additionally, we aim to provide climate projection results for the Carpathian Region and its vicinity, for (i) detailed regional scale analysis, and (ii) specific impact studies to various end-users, impact researchers, and decision makers. For these purposes, we use HadGEM2 global model outputs (1951-2100) as initial and lateral boundary conditions (ICBC) for the entire MED-44 CORDEX area covering the extended Mediterranean region of Europe. The 50-km horizontal resolution RegCM-outputs serve as ICBC inputs for further downscaling using 10 km as a horizontal resolution for a smaller domain covering Central Europe with special focus on the Carpathian Region. After completing the historical experiments, future scenarios are run taking into account RCP4.5 and RCP8.5 scenarios, which are based on the radiative forcing change by 2100.

THE ROLE OF PROTECTED AREAS IN GEO-HYDROLOGICAL RISK REDUCTION: AN EXAMPLE FROM THE GENOA'S FORTS AND WALLS PARK (ITALY)

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Keywords: flash floods, Genoa, geo-hydrological hazard, territory maintenance, urban vulnerability

Abstract: The city of Genoa is an emblematic international case, as it is associated to an high geo-hydrological risk: in the last 50 years 16 flood events occurred, including 6 with serious socio-economic damages and casualties. Climatic changes and the complete urbanization of floodplains cause an increased geo-hydrological risk. Local institutions propose structural and non-structural measures and monitoring activities for risk reduction, through short to long period programs of works. This contribution focuses the attention of the Genoa's Forts and Walls Park role in strategies about geo-hydrological risk reduction of Bisagno and Polcevera stream basins and for the old city stream catchments. Located on the ridges behind the historic centre of Genoa, a boundary between city and nature, the Protected Area can be strategic in the protection of the city from a geo-hydrological point of view. Established in 2008, however, the natural area has a fragmented institutional management and its maintenance is neglected. The Genoan flood events of 2011 and 2014 evidenced once again that the flood discharge is associated with suspended solids like mud, sand, gravel and plant material. The hazard in upper catchments involves a serious risk to the urbanized valley. Among the aims of the protected areas are the defense and recovery of the geo-hydrological asset: planning of ordinary and extraordinary maintenance and awareness raising of local institutions and citizenship in the care of peri-urban areas are considered essential for this Park.

SPATIAL DIFFERENCES IN MINERAL DEVELOPMENT OF MEADOW SOILS

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Abstract: Soil development under hydromorphic conditions may results intense mineral transformation and rapid vertical differentiation in the profile. Original papers refer more than hundreds of years for this kinds of mineral transformations. We suppose that this process could be more rapid. Present paper focuses on the profile development of a sandy meadow soil (calcic, gleyic Phaeozem ferric, arenic) from the soil mineralogical viewpoint. The main aim was to explore the degree of mineral phase alteration via soil formation during a half-century under hydromorphic conditions. The studied soil is located in a swampy area (near to Ceglédbercel, Hungary). The parent material deposited during an extremely heavy flood event in 1963. The reference (parent) material can be found near to the study site. We combined routine field tests (carbonate content, dipididil test) with laboratory measurements (selective extractions for the determination of amorphous and crystalline Fe, and Mn content; X-ray phase analysis; X-ray fluorescence spectroscopy; particle sizing by laser diffraction; NDIR and FT-IR and DRS spectrometry), whereas Eh and pH measured by field monitoring station. The most intense mineralogical transformations developed in the zone of the heaviest redox oscillation. Results show that well developed horizons have emerged during fifty years in the studied soil. This time was enough for bivalent and trivalent iron mineral crystallisation and smectite formation in this zone. The high proportion of amorphous and colloidal phases refers to very intensive recent processes. Soil formation under hydromorphic conditions proceeds at higher speeds contrariwise to the century time scale reported in sources (discussing non-waterlogged cases).

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