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An integrated approach to seismic risk management in a moderate seismicity alpine region

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The Aosta Valley Region territory (Italian Western Alps) is affected by a moderate historical seismicity. Nevertheless, in the last fifty years, the growth of the population and infrastructures have significantly increased the overall seismic vulnerability.

More in detail, the most vulnerable targets (international highways and the largest inhabited areas including almost 90% of the resident population), are concentrated in a narrow area along the main Dora Baltea Valley.

Therefore, moderate earthquakes with return times of about 100 years, could have important impacts on the regional economy.

Furthermore it has to be considered that, in areas marked by moderate seismicity, where potentially damaging earthquakes have long return times, the local authorities in charge of civil protection do not always seem to have a clear perception and a strong historical memory of the seismic risk.

To improve the general resilience towards the earthquake hazards, the Regional geological survey of the Aosta Valley Region has undertaken a process aimed at realization of an integrated and organic seismic risk management, financed by the EU on INTERREG ALCOTRA RISVAL project – Operational program Italy - France (Alps - ALCOTRA) 2014-2020.

All the planned activities have been mainly aimed to improve the geological knowledge already available, in order to achieve a clearer framework of the potential active tectonic structures (faults and thrusts), mapping the distribution and the geophysical properties of the quaternary deposits, which could potentially amplify the seismic waves.

More in detail, seismic microzonation studies have been extensively performed along the main regional road axes, including over 100 geophysical tests. At the same time, two detailed studies have been made: the first one regarding the potentially active fault "Aosta-Col di Joux-Ranzola" (located along the Dora Baltea Valley), the second one assessing the correlation between recent instrumental seismicity and active tectonic structures on the Italian side of the Mont Blanc Massif.

In a final step, a regional inventory of the seismic "strategic" buildings (hospitals, fire stations, town halls, ecc.) has been implemented

All the data have been integrated in the regional web portal, where the main geological, geotechnical and geophysical data of the Aosta Valley are already available. The inclusion of knowledge and data in a single web platform, which can be consulted online, improves the expected phenomena knowledge and its potential impacts on the territory, with a positive impact on the land management strategies and allowing the prioritization of costly structural reinforcements of buildings and infrastructures. In addition, the activities have been also conceived to support the regional civil protection authorities in the earthquake emergency planning activity, identifying the safest paths the rescue teams and the first infrastructures structures to be controlled after a seismic event.