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Historical mapping as a tool for identifying flood prone areas: the Pinerolo case study (Piedmont Region)

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Following a severe hydrological event in Northwestern Italy on 14-15 October 2000, the Chisone flood was analyzed in the Pinerolo area (Turin Province) to identify the causes behind the vulnerability of the local urban areas to fluvial dynamic processes. The town of Pinerolo is located at the mouth of the Chisone Basin, a water-drainage system (590 km^2 of total area) in the central sector of the Western Alps.

During the October 2000 flood event, streambank erosion, channel wandering and extensive flooding occurred in the Chisone floodplain, producing severe building damage, bridge destruction and road interruption. Numerous inspections in the days following the event permitted delimitation of flooded areas and measurement of hydrometric heights reached by water on land, with documentation of the effects and the different types of damage the inundation caused.

We conducted a historical research of the area by studying archival and cartographical documents dating from the 18th and 19th centuries. Most records were found in the Pinerolo historical archives, others in public libraries or archives of the local authorities. From an analysis of the historical cartography we reconstructed the growth patterns of urban development of Pinerolo to better understand the natural evolution of the surrounding environment. In the last decades of the past century, rapid and unplanned urbanization encroached on natural floodwater expansion areas, interfering with Chisone River dynamics. The historical analysis pointed out that much of the area struck by the 2000 event had already been hit many times in the past, despite the extensive public works carried out along the river course in recent years. The high losses

to the town caused by the 2000 flood were due to increased anthropic pressure on flood prone areas, which subsequently augmented urban area vulnerability to flooding. By superimposing different historical maps we analyzed the river channel changes that had occurred over the last three centuries. Human activity along the Chisone riverbed simplified the drainage network and narrowed the riverbed. During the 2000 event, a tendency of the Chisone to reoccupy its old pathway channels emerged.

Historical cartography analysis is an essential method to reconstruct paleochannel location in areas exposed to intense pressure from human activities. Moreover, the applied methodology provides an important tool to identify flood prone areas and can thus help in the verification of present land-use planning as a first step in a review process of existing urban plans and/or their general changes.