

The Identification of Landslide Phases Based on Documentary Data in the Czech Republic

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This paper focuses on landslide phases, this being a somewhat neglected aspect of landslide research. These are events during which an increased number of individual landslides have been concurrently activated. Landslide phases are an important proxy as their occurrence indicates the presence of a triggering event which predominantly involves thresholding rainfall or snow thaw.

The research area corresponds to the Czech Republic (Czechia), herein represented by two regions accounting for the highest socioeconomic impact due to landsliding in the past. The Outer Western Carpathians to the east are built on relatively weak Tertiary flysch rocks, while the areas in the north-west of the Czech Republic have a diverse lithology including Mesozoic sandstone, Tertiary volcanic rocks and basin sediments, thus predisposing both landsliding and rockfall. It should also be noted that the identified landslide phases certainly had a cross-border and even Central European extent.

The primary focus was on older events as the most recent landslide phases (1997, 2006 and 2010) have been sufficiently evidenced, while the older ones have not as yet been investigated enough. Identification of those older landslide phases can be carried out using documentary data, including chronicles of the affected villages and towns, newspapers, protoscientific communications or aerial photographs. The database on landslide events currently includes more than 570 records on old (pre- 1989) landsliding. At least 12 old landslide phases (when at least 10 landslides were registered) were identified from this database.

Each data source has its own specific drawbacks which will be addressed. Chroniclers occasionally had a different view of the importance of natural processes and their impacts. Newspaper sources are quite sensitive to landslide events, but their availability strongly differs across individual regions as is the case with old maps and protoscientific communications. Eyewitnesses and persons directly impacted by landsliding were also interviewed. Aerial photographs taken prior to 1989 were only of limited use as they were predominantly taken during growing seasons.

The primary issue when comparing impacts of landsliding with older landslide phases is a lack of reliable data. Whereas many details concerning landslide events are available at present (e.g., www.rupok.cz), only selected landslides were evidenced earlier. Not even property damage was recorded in municipality chronicles regularly. A different degree of urbanization and infrastructure also ranks among the limiting factors for direct comparison of the impacts of landsliding. A number of the landslide phases were nevertheless compared to causal factors (precipitation time-series) evidencing a clear agreement and assisting in the study of the thresholds of landslide triggers.