

CRITUQUES — RECENZJE

Brázdil Rudolf, Kirchner Karel (editors): *Vybrané přírodní extrémy a jejich dopady na Moravě a ve Slezsku (Selected natural extremes and their impacts in Moravia and Silesia)*. Brno–Praha–Ostrava, Masarykova universita, Český hydrometeorologický ústav, Ústav geoniky Akademie věd České republiky, 2007, 431 pp. ISBN 978-80-210-4173-8.

At the end of the previous year, a remarkable book dedicated to natural extremes in the Moravian and Silesian parts of the Czech Republic was published that will undoubtedly engage the attention of geographers and other specialists dealing with landscape. Although this monograph has much broader then geomorphological span, I recommend it warmly especially to the attention of geomorphologists and not only in Czechia but also in the entire Carpatho-Balkan region as the study area is situated on the wide contact zone of the Western Carpathians and the Bohemian Massif. This team work is a result of interdisciplinary cooperation of many specialists, mainly from three publishing institutions: the Masaryk University, Brno, the Czech Hydrometeorological Institute, Prague and the Institute of Geonics, ASCR, Ostrava,

Moravia and Silesia belong similarly as the other Carpatho-Balkan countries to those parts of the world where natural extremes annually cause damage and loss of human life. It especially concerns floods that represent the most destructive natural phenomena in the conditions of central Europe and often acquire a character of natural disasters. A whole range of other natural extremes with recorded manifestations at local or regional scales is also discussed.

The introductory chapter is devoted to terminological questions. In the context of the international perception of key terms, the authors explain their view of *natural extremes*, *natural hazard* and *natural risk*. They also justify the selection of natural extremes analysed in the book and divide them into *hydrometeorological* and *geomorphological* extremes.

The second chapter starts with the territorial and administrative development of Moravia and Silesia since the beginning of the Czech Kingdom in the 11th century until now. Its main parts describe physico- and socio-economico-geographical characteristics of the territory with respect to natural extremes. The former assesses geological, geomorphological, climatic and hydrological conditions, the latter the development of settlement and industry, main features of transport network and long-term land use changes.

The third chapter addresses the material and methods used in the study of natural extremes. As to the evaluation of hydrometeorological extremes, two groups of data were available, namely so-called proxy data concerning the period before the beginning of systematic observations and measured data acquired during the period of instrumental measurements. As to the assessment of geomorphological extremes, the chapter focuses mostly on geomorphological mapping; other methods used are characterised in detail in the following chapter dealing with particular extremes. This chapter also provides information on modelling natural extremes in GIS environment, production of maps of these phenomena and their cartographic visualisation.

The forth chapter presents a detailed evaluation of the temporal and spatial variability of the selected hydrometeorological and geomorphological extremes. The key criterion of the selection of hydrometeorological extremes to be analysed was the extent of material damage and loss of human life. Thus, extremely high precipitation totals, droughts, floods, strong winds and hailstorms were assessed. From the viewpoint of the above criterion, floods are the most destructive natural extreme in Moravia and Silesia. They are differentiated according to meteorological causes as rain-, snow-, mixed- and ice-floods. Floods reconstructed using documentary sources are characterised according to the drainage basins of selected rivers (Bečva, Dyje, Svratka, Opava), while floods in the period of systematic hydrological observations are characterised for the whole area of Moravia and Silesia. Special attention is paid to several the biggest floods happened in August 1880, July 1903, August/September 1938, July 1997 and March/April 2006. One of the sub-chapters is dedicated to flash floods recorded in the 20th century.

Geomorphological extremes are divided into gravitational slope processes and natural seismicity, while the impact of the latter is negligible. The threat from gravitational processes is considerably more important. The authors characterise creep and rock falls but close attention is paid to landslides. These are divided according to 1) the character of shear planes (rotational, planar and complex landslides), 2) the shape of the ground plane and surface (stream-shaped, planar-shaped and frontal-shaped slides), and 3) the depth of the moving layer (shallow, deep and very deep slides). The attention is paid to historical aspects, survey and inventorying of landslides, as well as to geomorphological aspects of the origin, development and spatial distribution of slope deformations. Interestingly, the oldest known slope deformation is dated back to the year 1770. Discussion of the causes of landsliding includes a detailed analysis of the climatic factor. Important precipitation periods, resulting in landslide formation in Czechia as a whole, occurred in the years 1882, 1897–1900, 1939–1941, 1965, 1967, 1981–1982 and 1995–1996. One of the sub-chapters is dedicated to the digital database of the Czech Geological Survey — Geofond, that register all known gravitational deformations. Naturally, the majority of the deformations are situated in the Carpathian part of the study area; their occurrence in other regions is increased only in places where significant anthropic interventions are concentrated.

Subsequent chapter discusses the impact of the investigated natural extremes on people and landscape. It concerns all natural threats characterised in the previous chapter. The main problem of the assessment of the impact of hydrometeorological extremes is that their descriptions appear only sporadically in records of meteorological or hydrological observations and their systematic documentation does not even exist with insurance companies. Considering its impact, the already mentioned flood of July 1997 was a particularly exceptional event. Territorially the largest one in the 20th century, it affected 34 districts in Moravia and Silesia and also eastern Bohemia, left 52 dead, and caused damage to the extent of 62.2 billion Czech crowns. Altogether 538 habitation zones and conurbations were affected. Some 2,151 flats were destroyed and another 5,652 were rendered unsuitable for habitation for a long time afterwards. 946 km of railway tracks, 13 railway stations and 26 bridges were flooded and damaged. The most tragic of 302 flash floods recorded in Moravia and Silesia in the 20th century, occurred on June 9, 1970 in the Kyjovka River catchment when after extreme rainfall in the Ždánice region 34 miners died in a flooded lignite mine at Šardice.

As geomorphological extremes appear in Moravia and Silesia on a somewhat local or subregional scale, human deaths due to them tend to be exceptional and the extent of material damage is lower. Permanent natural hazard is represented by water and wind erosion. The attention is paid also to the impacts of seismicity, both mining-induced and technical (vibrations).

The sixth chapter discusses the results of the study of extremes in Moravia and Silesia in the context of global warming. Authors state that future development of hydrometeorological events and consequently also of geomorphological extremes will be significantly influenced by the further evolution of the climate on the Earth.

The concluding chapter raises a question how the current climate change will influence natural extremes and presents proposals of scientific, forecasting and societal measures how to mitigate possible environmental impacts.

The reviewed monograph represents a significant contribution to recognizing of temporal and spatial variability of natural extremes in Moravia and Silesia and is important with respect to preventive aiming to minimize potential damage. It may also be projected into the field of crisis management, in which the studied extremes are a component of natural risk. The book refers to the fact that problems of natural extremes is so serious that systematic attention to their study should be paid.

I would like to congratulate Rudolf Brázdil, Karel Kirchner and their co-authors for the publishing of such valuable scientific accomplishment that is important not only in the conditions of Czech Republic. Though written in Czech, the book has an extensive English summary (61 pages), and thus it can address colleagues not only from the Carpatho-Balkan area but also from other parts of Europe.

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