

Abstract

In the era of global warming, in which extreme events are great threats to human society and the environment, the public is concerned about the possible consequences of these events. Throughout history, due to their catastrophic consequences, floods have affected human societies many times. Therefore, floods have been the main subject of great numbers of studies globally. Nevertheless, the lack of a sufficient and reliable dataset for floods before the industrial period (i.e. from around the mid-19th century) has limited studies of this topic. Therefore, documentary evidence, as a reliable source, served a significant part in the development of research for flood studies before the 19th century. This documentary evidence was used to establish four extensive databases detailing historical floods in Poland from 1001 to 1800. In addition, floods that occurred from 1801 to 2000 in Poland were compiled from available published literature on the subject to compare with the frequency of floods in 1001–1800. The databases of floods in the 11th–18th and information on flood frequency in the 19th–20th centuries were used to deeply investigate flood frequency, intensity, and origins in Poland. The results demonstrated the occurrence of 1,252 floods in 1001–1800 and 428 floods in 1801–2000 within the area of Poland. The most flood-prone period was the 18th century (356, 28%) and the least frequent period was the 11th–15th centuries (210, 17%). Among the three river basins of Poland (i.e., Oder River, Vistula River, and Baltic Coast rivers basin), floods were most abundant in the Oder River basin (671, 55%) and then Vistula River basin (522, 43%). The order of flood frequencies among the main regions of Poland was Silesia (553, 43%), followed by Baltic Coast and Pomerania (289, 23%), Lesser Poland (212, 17%), Greater Poland (109, 8%), Masovia (53, 4%), and Masuria-Podlasie (11, 1%). For 46 (4%) records, based on information in weather notes, there is no information about the exact region of floods (for which the miscellaneous category “Poland” was applied). The majority of floods occurred in the summer (46%), with fewer occurring in the autumn (8%). The classification of flood intensity revealed that, based on the Brázdil et al. (2006) classification, the largest category of floods (33% of all occurrences) was “above-average, or supra-regional flood,” whereas “extraordinary” floods (70%) were the most classified category for floods based on the Barriendos and Coeur (2004) classification. Moreover, rain was the leading cause of floods in Poland (44%) based on the Lambor (1954) classification. In general, by employing the Mann–Kendall test analysis, it was indicated that flood frequency in Poland decreased significantly (p -value < 0.05) between 1501 and 2000. On the other hand, positive trends were observed in the sub-periods 1501–1800 and 1801–2000, with a statistically significant trend only for 1801–2000.