

## **The Hunger Stones: a new source for more objective identification of historical droughts**

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Extreme droughts recorded recently more frequently in different parts of the world represent the most serious environmental problem. Our contribution identifies periods of hydrological drought. The extreme drought period in summer 2015 enabled the levelling of historical watermarks on the „Hunger Stone“ (Hungerstein) in the Elbe in Czech town of Děčín. The comparison of the obtained levels of earlier palaeographic records with systematic measurements in the Děčín profile confirmed the hypothesis that the old watermarks represent the minimal water levels. Moreover, we present a review of so far known Hunger Stones in the Elbe River with their low-level watermarks.

For identification of the drought period duration we used the oldest water level records from the Czech Hydrometeorological Institute (CHMI) database archive: Magdeburg (since 1727), Dresden (since 1801), Prague (since 1825) and Decin (since 1851) time-series. We obtained more objective and complex information on all historical droughts between 1727 and 2015. The low water-marks on Hunger Stones give us a possibility for augmentation of systematic records and extended our knowledge's back to 1616.

The Hunger Stones in the Elbe River with old watermarks are unique testimony for studying of hydrological extremes, and last but not least also of anthropogenic changes in the riverbed of the Elbe.