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Rock uplift of Pleistocene sediments from the northern Po Plain, Italy

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Facies analysis applied to five 150-200-m-deep cores taken by Regione Lombardia in the central-northern Po Plain allowed us to recognize an overall regressive sequence consisting of cyclotemic shallow marine and fluvio-deltaic deposits overlain by fully continental sediments. Magnetostratigraphy, coupled with calcareous nannoplankton biostratigraphy, was used to date marine and fluvial-deltaic sediments to the Early Pleistocene and continental sediments to the Middle-Late Pleistocene. Sediment accumulation rates were of ˜300-400 m/Myr in the Early Pleistocene, whereas an overall reduction in sediment accumulation rates to ˜60-80 m/Myr, associated to relevant unconformities, characterized the Middle-Late Pleistocene. Most marine deposits in the cores lie above sea level highstands of corresponding age, suggesting that they have been uplifted. In order to estimate the observed rock uplift, sediments were backstripped to elevations at times of deposition (expressed in meters above current sea level) by applying a simple Airy compensation model. Decompaction tests showed that sediment compaction was negligible, with an overall increase of sediment thickness of not more than 0.7%; this is explained with the limited burial depth attained by these sediments and the relatively low content of most compressible clay intervals. The correlation of the isostatically corrected sedimentary facies to a glacio-eustatic reference curve obtained from classic oxygen isotope studies highlights a positive elevation mismatch (rock uplift) in the range of 70-120 m, which occurred after the onset of the major Pleistocene glacial-interglacial cycles at rates of at least ˜150-90 m/Myr. Although the driving forces of the observed rock uplift cannot be unambiguously identified, the overall trend of increasing uplift values from the buried front of

the Alps to the chain axial zone and its timing of onset after the beginning of the major Pleistocene glacial-interglacial cycles seem to point to an isostatic readjustment of the chain probably due to the long-term erosional removal of sediments during major Pleistocene glacial advances.