TSUNAMIS TRIGGERED THE LATE FRASNIAN KELLWASSER EXTINCTION EVENT

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The long duration of the late Frasnian marine extinctions is related to the progressive decrease in the atmospheric oxygen rate, which had dramatic consequences on marine environments, and to the Upper Kellwasser Event, UKW (*Palmatolepis linguiformis* conodont Zone) at the Frasnian–Famennian boundary. The decrease in the atmospheric oxygen rate is suggested notably by the widespread development of brachiopods adapted to oxygen–depleted environments. In the proximal areas of the Namur–Dinant Basin (southern Belgium), apart from shales corresponding to the Lower Kellwasser Event, LKW (Upper *P. rhenana* Zone) and the UKW, levels of anoxic and dysoxic shales commonly occur, whereas in the most distal part of the basin, anoxic shales are known from the base of the Upper *P. rhenana* Zone to the Lower *P. triangularis* Zone, preventing the development of benthic fauna most of the time. The LKW corresponds to the maximum relative sea–level of the first of the two late Frasnian third–order sequences that were recognized both in shallow and deeper settings. The LKW had strictly no effect on the distribution of corals and brachiopods, except that they are locally and briefly absent when anoxic conditions prevailed. The UKW is responsible for the last Frasnian extinctions. It is widespread in the Namur–Dinant Basin and developed even in places where anoxic shales were previously absent since those of the LKW. Everywhere, the UKW rests on a 0.15 to 1 m–thick limestone bed with shaly intercalations. The particular structure of this carbonate bed is interpreted as the result of a series of at least seven tsunamis that triggered the input of anoxic–dysoxic waters in previously oxygenated environments. Isochronous levels related to tsunamis are known worldwide and are questionably related to a meteorite impact into the Palaeotethys Ocean. Therefore, the end Frasnian extinction is most probably related to both a series of tsunamis and the resulting spread of dysoxic and anoxic waters into areas that were already poorly oxygenated.