DATING OF GRAVITY-DRIVEN MASS FLOW DEPOSITS USING GEOCHEMICAL, PHYSICAL PROPERTIES, AND SEISMIC DATA

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The continental margin of the western Argentine Basin is an area of highly dynamic sedimentary conditions. Currents with high flow velocities extending to the sea floor are responsible for winnowing and re-distribution of vast amounts of sediments on the shelf and upper slope resulting in gravity-driven mass flow deposits (e.g. slides, slumps). Measurements of pore water sulphate content allow a comprehensive and interpretative classification of the shape of sulphate profiles. The different types can be explained by sedimentary slides in combination with variations in the methane flux from below. Since slides may keep their original sedimentary signature a combined analysis and numerical modelling of geochemical, physical properties, and hydro acoustic data can be applied in order to reconstruct the timing of sedimentary slides. We present first order estimates of the dating of sedimentary events for an area where conventional stratigraphic methods failed. Present day conditions reflect the imprint of events that occurred on time scales between decades to thousands of years ago. Thus, there exists a persisting mass transport from the shelf into the deep-sea in this region, depositing relative high amounts of organic material and other reactive compounds (i.e. Fe(III) minerals). The nearly unlimited availability of reactive iron phases in this region maintains low hydrogen sulphide levels in the sediments by a nearly quantitative precipitation of all reduced sulphate by AOM. For the total region we can estimate a sulphate flux of 66˚ugigamoles per year into the zone of AOM. On a global projection this may sum up to about 2.6 teramoles per year. This is about twice the literature-derived value of the global sulphur burial in marine sediments . Thus, anaerobic methane oxidation may contribute significantly to the global sulphur cycle.