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δ^{18}O water isotope in the *i*LOVECLIM model (version 1.0) – Part 1: Implementation and verification

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Abstract. A new ^{18}O stable water isotope scheme is developed for three components of the *i*LOVECLIM coupled climate model: atmospheric, oceanic and land surface. The equations required to reproduce the fractionation of stable water isotopes in the simplified atmospheric model ECBilt are developed consistently with the moisture scheme. Simplifications in the processes are made to account for the simplified vertical structure including only one moist layer. Implementation of these equations together with a passive tracer scheme for the ocean and a equilibrium fractionation scheme for the land surface leads to the closure of the (isotopic-) water budget in our climate system. Following the implementation, verification of the existence of usual δ^{18}O to climatic relationships are performed for the Rayleigh distillation, the Dansgaard relationship and the δ^{18}O –salinity relationship. Advantages and caveats of the approach taken are outlined. The isotopic fields simulated are shown to reproduce most expected oxygen-18–climate relationships with the notable exception of the isotopic composition in Antarctica.

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