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Depth evolution of the Meirama pit lake, A Coruña, NW Spain

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The Meirama pit lake is a water mass in the process of controlled flooding that, by the end of December 2015, can be described as a steadily stratified meromictic system. The deepest portion of the lake (monimolimnion) is isolated regarding the annual mixing dynamics (December/January) of the upper water body (mixolimnion), for which the depth of mixing is restricted to a water column of 35-40 m thick. Due to the contrasting flooding history (access of groundwater at the beginning and mixed access of stream/groundwater (being dominant the stream water) the deepest portion of the lake is separated from the upper, non-mixed layer by a marked chemocline. Strictly speaking, the monimolimnion of a meromictic lake extends to the waters located beneath the mixed lake layer. In the case of the Meirama Lake the monimolimnion is internally stratified and made of two major water bodies. From hereafter the deep and upper monimolimnion will be identified as bottom and middle sections of the lake while the mixolimnion is referred to as the surface layer. The general characteristics and evolution of the Meirama Lake have been reported elsewhere. In this work we focus on a summary description of the chemical evolution of the monimolimnion of the lake based on data gathered between 2009 and 2015 from the still on-going monitoring survey. The chemical evolution of the monimolimnion of the lake differs significantly from that of the mixolimnion. In general, surface water is sensible to seasonal fluctuations due to weather conditions, rainfall and biogeochemical processes. The middle and bottom sections are not sensible, in general, to this effects and their evolution obeys to a number of internal processes. In the case of temperature we observe a nearly constant gradient increase (0.001 ºC/day) in the middle and deep lake waters up to the beginning of 2012, where it remains constant. The rise in temperature is likely due to the heat provided by groundwater seepage whose temperature is above that of the lake water at the corresponding depth. Likewise, electrical conductance shows a similar constant-rate increasing rate (0.223 and 0.115 [U+F06D]S/cm-day in the bottom and middle sections, respectively) whose origin we also associate with groundwater seepage. Based on a wide number of parameters (O_2, Cl, SO4, NO_3, NO_2, NH4, Fe, Mn…) we observe that the monimolimnion of the lake, either in its bottom or middle layer is a rather dynamic (transient) geochemical system.