EGU22-8743
https://doi.org/10.5194/egusphere-egu22-8743
EGU General Assembly 2022

Using LANDO as a universal wrapper for applying multiple age-depth modeling systems for sediment records from Arctic lake systems

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Refined dating techniques and high-precision radiocarbon dating have enabled more accurate age controls for paleoenvironmental reconstruction of lake systems. However, low bioproductivity and the influence of old carbon have a profound impact on radiocarbon dating series of non-varved sediment records from Arctic lakes. Geochronological tools such as software systems for age-depth modeling provide sophisticated justifications for age-depth relationships. But because there are many different tools available with varying underlying mathematical methods and models, the model output can show diverging results, e.g., for problematic sediment cores with scatter age dating points. A detailed comparison of the results of individual modeling system is therefore often tedious and potentially error-prone. Due to time constraints and a lack of alternative options, users typically only select and apply one modeling system to provide a geochronological timeframe for paleoenvironmental interpretation. Therefore, we introduce our "**L**inked **a**ge a**n**d **d**epth m**o**deling" (**LANDO**) approach that links five modeling systems (*Bacon, Bchron, clam, hamstr, Undatable*) in a single multi-language Jupyter Notebook. LANDO reduces the effort of using established modeling systems for both single and multiple dating series and makes the results directly comparable. In addition, we introduce an ensemble age-depth model that uses the output from all models to create a data-driven, semi-informed age-depth relationship. In our talk we will highlight our adapted fuzzy change point method, in which we used independent proxy data to evaluate the performance of each modeling system in representing lithological changes. LANDO is already publicly available on GitHub: https://github.com/GPawi/LANDO.