Review of "Modeling subgrid lake energy balance in ORCHIDEE terrestrial scheme using the FLake lake model" by Bernus Anthony and Ottlé Catherine

Article shows results of testing 1-D lake parametrization scheme FLake incorporated in the ORCHIDEE land surface scheme. Experiments are performed at different horizontal resolutions and temporal scales with different lake mean depth aggregation techniques. Experiment results are compared with observed lake surface temperatures and ice start, end, duration dates.

GENERAL COMMENTS

In the paper lake depth from HydroLAKES is used as ground truth, yet over some latitudes and regions this data plays crucial role. It would be good if data was crosschecked/verified at least for categories where only few lakes were used (small number of lakes was used).

For different lake categories errors are provided, but it is obvious that not all categories have vast amount of lakes inside, so it would be good to see if numbers presented have statistical significance. For example errors can be high for some latitudes but are based only on two lakes, so this is statistically not significant at all.

Authors use different lake mean depth aggregation techniques – it would be a great advantage if they could also add MODE aggregation technique, or at least say about it in discussion.

Paper has huge amount of abbreviations and some are not explained (e.g., line 74 – LM4, GFDL, etc.) – it would be a big help for the reader to have as little abbreviations as possible, e.g. to keep only the ones that are used all the time, like LSWT, add remove all unnecessary ones, e.g. write them in full and add abbreviation in brackets if necessary.

In Section 4.2.1 model is evaluated based on 8 lakes, but all these lakes are huge and their surface temperature can be also due to internal currents, wind fetch, etc., so these lakes can't represent lakes globally even though they are located in different climate zones. Most of lakes globally are quite small in area and around 10 m deep (mean depth). Results are interesting and well presented but it should be noted that they are not representative globally.

Some sections, like Section 4.3, have a very interesting results, for better understanding it would be great to put it in a table – all numbers easy to compare and understand.

TECHNICAL COMMENTS

l.31 "Lake distribution is spatially unequal all other the world with two regions …" – should instead of "other" be "around"?

l.69 "the UK Met Office Unified Model and its JULES Land simulator (Rooney and Bornemann, 2013)" – I guess FLake there is not couples operationally yet.

l.114 (same as l.31) – "all other the world" – should it be "around"?

l.183 "the free water bottom temperature" – what is meant here exactly?

l.243 "to adjust the time split factor which has been finally set to a value of 50" – could you explain with more details?

l.387 (same as l.31) – "all other the world" – should it be "around"?

Figure 4 – explain please column plots – what different shading represent?

Figure 7 – explain please left plot – what columns and lines represent exactly?

l.589 "GHG fluxes like carbon and methane…" – did you mean carbon dioxide?