

Response to comments of reviewers

Anonymous Referee #1

Cao et al. manuscript presents a comprehensive pollen database including quite well-distributed records from Siberia covering the last 40,000 years. The database is well presented, properly taxonomically harmonized and temporally standardized. It is stored and easily accessible in PANGAEA. Cao et al. manuscript deserves publication in ESSD after the authors include the major and minor modifications listed below.

Major comments

- I have not found a table devoted to the dating information; i.e. the dated samples used to establish the age models and their corresponding depth, age and age uncertainties, and more importantly the lab code. This table should spell out clearly and not just with a code, the dated material.

Response: We prepared a table including dating data together with their depth, uncertainties, material and lab code for each pollen record. We have updated our dataset in Pangaea.

- It would be also useful that Cao et al. generate biome pollen percentages (temperate forest, boreal forest, steppe: : :) to optimize the use of this database by non-pollen paleoclimatologists.

Response: In the new version of the dataset uploaded to Pangaea, we added the plant functional type (PFT) for each pollen taxon (106 taxa), which can help non-pollen palaeoclimatologists to understand the life-form represented by these pollen taxa, and further their environmental representations. We have updated our dataset in Pangaea and sent a copy to the ESSD editor committee.

- Regarding the age models, the authors should explain why they have used the Bayesian age-depth modeling taking into account the difficulties inherent to this method to obtain information about accumulation rates and other informative user-defined priors (Blaauw and Christen, 2011).

Response: We re-established the age-depth models for all pollen records in order to make these pollen data comparable temporally. We set the same priors for the Bacon model; the

accumulation rates were estimated by the model automatically for each pollen record. In the new version, we have explained the process in detail.

Line 95-102:

“To obtain comparable chronologies, age-depth models for these pollen records were re-established using Bayesian age-depth modeling with the IntCal09 radiocarbon calibration curve (“Bacon” software; Blaauw and Christen, 2011). We set up a gamma distribution accumulation rate with a shape parameter equal to 2, and for the accumulation variability a beta distribution with a “strength” of 20 for all records, while we set up a mean “memory” of 0.1 for lake sediments and a high “memory” of 0.7 for peat and other sediment types (following Blaauw and Christen, 2011).”

Minor comments

-Introduction: The authors should add the reference of Sanchez Goñi et al., 2017, The ACER pollen and charcoal database: a global resource to document vegetation and fire response to abrupt climate changes during the last glacial period, ESSD 9: 679- 695) to highlight the relevance of their Siberian pollen database. The ACER database only includes very few Siberian pollen records.

Response: We have added the reference suggested by reviewer in the new version.

Line 62-65:

“Pollen records from Siberia have rather seldomly been included in global, Northern Hemisphere, or synthesis works (Sanchez Goñi et al., 2017; Marsicek et al., 2018), probably because (1) few records are available in open databases or (2) available data are not taxonomically harmonized and lack reliable chronologies.”

- Page 4, line 8: Please explain the meaning of “palsa”.

Response: “palsa” is “peat permafrost mound”, and we have explained it in the new version.

Line 100-104:

“For the 20 pollen records without raw pollen counts, we set the terrestrial pollen sum based on the descriptions given in the original publications (approximate values or ranges for 16 records; e.g. it is more than 600 for the pollen record from Chernaya Gorka Palsa (peat permafrost mound), and between 452 and 494 grains for Two-Yurts Lake.”

- In the text and in the caption of Figure 2: *Larix* should be in italics.
- Caption of Figure 3: the genus should be in italics.
- Appendix Table 2 : Replace "*Hippophae*" with "*Hippophæ*"

Response: We have checked. All pollen names in our manuscript are in italics. And we have replaced "*Hippophae*" by "*Hippophæ*".