**Table S1. Database of radiocarbon reservoir age of 81 inflow/outflow lakes in China based on published research in the past 20 years**

Method indicates how reservoir ages were obtained: (0) Terrestrial Plant Residues, reservoir age is zero; (1) Ignore the lake radiocarbon reservoir effect or considered as negligible; (2) Modern lake water/shell/plant/animal; (3) Surface sediments TOC; (4) Surface sediments 137Cs/210Pb; (5) Linear regression/piecewise linear regression; (6) Stratigraphic alignment; (7) Reliable dating materials defined by the author; (8) Independent age determination(OSL, U/Th, and varve counting); (9) Geochemical model.

TOC denote total organic carbon. PR denote plant residue. DOC denote dissolved organic carbon. DIC denote dissolved inorganic carbon.

# Inflow lake

## Northeast and North-central China

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Lake name | Latitude  (°N) | Longitude  (°E) | Altitude  （m） | Bedrock | TOC  (%) | Reservoir Age (14C years BP) | Dating materials: amount | Method | References |
| 1 | Lake Ningjin | 37.39 | 114.87 | 28 | Quaternary sediment | 0-1 |  | TOC:4 | 1 | (Guo et al., 2005) |
| 2 | Lake Gonghai | 38.9 | 112.23 | 1860 | Sandstone;  Shale;  Quaternary sediment | 5-30 |  | PR:25 | 0 | (Chen et al., 2015a) |
| 3 | Lake Qigai Nuur | 39.4 | 109.4 | 1308 | Quaternary sediment | <4 | 1950 | TOC:17 | 3 | (Sun and Feng, 2013) |
| 4 | Lake Yanhaizi | 40.1 | 108.4 | 1180 | Quaternary sediment | 0.09-1.08 | 879 | TOC:2;  humin:7;  pollen:1 | 5 | (Chen et al., 2003) |
| 5 | Lake Daihai | 40.6 | 112.7 | 1221 | Quaternary sediment | 1-6 | 360 | TOC:8 | 5 | (Xiao et al., 2004)  (Xiao et al., 2006) |
| 6 | Lake Anguli Nuur | 41.3 | 114.3 | 1315 | Quaternary sediment;  Basalt | 0-5 | 0 | Charcoal:6;  PR:2;  TOC:5 | 1 | (Li and Liu, 2018) |
| 7 | Lake Bayanchagan | 41.7 | 115.2 | 1335 | Quaternary sediment  Basalt |  | 570 | TOC:7;  Seed:2 | 3 | (Jiang et al., 2006) |
| 8 | Sihailongwan Maar lake | 42.28 | 126.6 | 797 | Pumic tuff;  Siliciclastic particles; pyroclastics | 4.4-17.3 |  | PR:36 | 0 | (Schettler et al., 2006)  (Stebich et al., 2015) |
| 9 | Lake Xiari Nuur | 42.6 | 115.5 | 1230 | Quaternary sediment;  magmatic and metamorphic rocks |  | 0 | PR:4;  Stem:3;  TOC:10 | 4 | (Tang et al., 2015)  (Sun et al., 2018) |
| 10 | Lake Bayan Nuur | 43.12 | 113.5 | 1070 | Quaternary sediment | 0.1-4 | 360 | TOC:41 | 5,6 | (Ming et al., 2020b) |
| 11 | Lake Dali | 43.3 | 116.6 | 1220 | Quaternary sediment;  basalt | 0-6 | 472 | TOC:21 | 3 | (Fan et al., 2017) |
| 12 | Lake Chagan Nuur | 43.44 | 115.03 | 1010 | Quaternary sediment | 4-14 | 152 | TOC:27 | 3 | (Li et al., 2020) |
| 13 | Moon lake | 47.51 | 120.86 | 1190 | Basalt | 1-23.6 |  | PR:15;  TOC:6 | 1 | (Qiang et al., 2010) |
| 14 | Lake Tianchi  (Wudalianchi volcano group) | 48.74 | 126 | 596.9 | Basalt | 5-50 | 0 | TOC:7;  Seed:4;  Leaf:3 | 8 | (Zhou et al., 2016) |
| 15 | Lake Hulun | 49 | 117.5 | 545.3 | Quaternary sediment;  volcanic rocks |  | 685 | TOC:13 | 3 | (Xiao et al., 2009)  (Wen et al., 2010) |

## Southeast and Southwest China

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Lake name | Latitude  (°N) | Longitude  (°E) | Altitude  （m） | Bedrock | TOC  (%) | Reservoir Age (14C years BP) | Dating materials: amount | Method | References |
| 16 | Jiulongchi Wetland | 27.89 | 108.69 | 2212 | metasandstone; volcanic rock | 2-8 |  | TOC:9 | 1 | (Quan et al., 2019) |
| 17 | Lugu lake | 27.68 | 100.8 | 2690 | Quaternary sediment;  Limestone;  Mudstone;  Sandstone | 3.78-13.8 |  | PR:9 | 0 | (Ouyang et al., 2019) |
|  | 173 | PR:5 | 4 | (Sheng et al., 2015) |
| 1-6 | 1662 | PR:7;  TOC:15 | 2 | (Wang et al., 2014b) |
| 3-12 |  | PR:6 | 0 | (Wang et al., 2020) |
| 18 | Lake Haligu | 27 | 100.18 | 3277 | Basalt;  Limestone |  |  | Humic acid:4 | 1 | (Song et al., 2012) |
| 19 | Lake Chenghai | 26.53 | 100.66 | 1503 | Basalt;  Quaternary sediment |  |  | Charcoal:4 | 0 | (Hillman et al., 2016) |
|  |  | PR:8 | 0 | (Sun et al., 2019) |
| 0.8-2.9 | 350-1210 | PR:11;  TOC:5 | 7 | (Xiao et al., 2017) |
| 20 | Lake Tengchongqinghai | 25.13 | 98.57 | 1885 | Andesite;  Basalt;  Tuffaceous breccia |  |  | PR:2;  Wood:2;  Leaf:2;  Twig:3;  TOC:4 | 1 | (Peng et al., 2019) |
| 0-60 |  | PR:16 | 0 | (Yang et al., 2016) |
|  | 180 | PR:10  TOC:7 | 7 | (Zhang et al., 2015) |
| 21 | Dahu lake | 24.75 | 115.03 | 246 | Granite | 0-40 |  | PR:17 | 0 | (Zhou et al., 2004) |
|  |  | TOC:12 | 1 | (Wei et al., 2018) |
| 0-35 |  | PR:4  Charcoal:1  TOC:15 | 1 | (Zhong et al., 2010) |
| 22 | Qilu Lake | 24.01 | 102.75 | 1797 | Quaternary alluvium;  Dolomite;  limestone |  |  | Charcoal:6  leaf:1 | 0 | (Hillman et al., 2020) |
| 0-25 |  | TOC:7;  Carbonate:2;  Mollusk shell:3;  Wood:2 | 1 | (Hodell et al., 1999) |
| 23 | Huguang maar lake | 21.15 | 110.28 | 23 | Volcanic | 0-18 |  | PR:5;  TOC:4 | 1 | (Yancheva et al., 2007) |
| 0-12 |  | PR:9;  TOC:5 | 1 | (Jia et al., 2015) |
|  |  | leaf:15;  Seed:1;  TOC:6 | 0 | (Zhang et al., 2020) |
| 0-18 |  | PR:10;  Charcoal:2 | 0 | (Wang et al., 2016) |
| 24 | Lake Tianyang | 20.51 | 110.31 | 90 | Basalt | 1.7-22.8 |  | PR:5  TOC:2 | 1 | (Wang et al., 2014a) |
| 25 | Lake Shuangchi Maar | 19.94 | 110.18 | 40 | Pyroclast | 0-20 | 0 | TOC:11  Pollen:5 | 3 | (Dodson et al., 2019) |
|  |  | PR:10  TOC:1 | 1 | (Yang et al., 2009) |
| 0-60 |  | PR:11 | 0 | (Ling et al., 2020) |
|  |  | TOC:6 | 1 | (Zhang et al., 2018) |

## Northwest China

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Lake name | Latitude  (°N) | Longitude  (°E) | Altitude  （m） | Bedrock | TOC  (%) | Reservoir Age (14C years BP) | Dating  materials: amount | Method | References |
| 26 | Qingtu lake | 39.05 | 103.67 | 1291 | Basalt;  Limestone;  Slate;  Quaternary sediment | 1-2.5 | 0 | TOC:8  Shell:6 | 8 | (Long et al., 2011) |
| 27 | Lake Balikun | 43.65 | 92.8 | 1575 | Quaternary sediment |  | 790 | PR:1  Pollen:1  TOC:11 | 7 | (Tao et al., 2010)  (An et al., 2012) |
| 0-5 | 750 | TOC:7 | 5 | (Xue and Zhong, 2011) |
| 28 | Lake Wulungu | 46.46 | 87.5 | 478.6 | Sandstone;  Quaternary sediment | 0.5-3 | 760 | TOC:7 | 4 | (Liu et al., 2008b) |
| 2-8 | 760 | TOC:4  Charcoal:1 | 4 | (Duan et al., 2018)  (Zhang et al., 2016c) |
| 29 | Lake Aibi | 44.9 | 82.5 | 200 | Quaternary sediment | 0.5-1.3 | 1800 | TOC:8 | 5 | (Wang et al., 2013) |
| 30 | Lake Sayram | 44.5 | 81.16 | 2071.9m | Sandstone;  Volcanic rock | <1 | 778 | TOC:14 | 5 | (Jiang et al., 2019) |
| 31 | Lop Nuur | 40 | 90 | 780-795 | Quaternary sediment |  | 180 | PR:1  Charcoal:1  TOC:19 | 7 | (Liu et al., 2019) |
| 0-2 | 3229 | TOC:22  OSL:10 | 3 | (Zhang et al., 2012) |

## Tibetain Plateau

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Lake name | Latitude  (°N) | Longitude  (°E) | Altitude  （m） | Bedrock | TOC  (%) | Reservoir Age (14C years BP) | Dating  materials: amount | Method | References |
| 32 | Lake Qinghai | 37 | 100 | 3194 | Limestone;  Sandstone;  Shale | 0-4 | 135,  1143,  2523 | TOC:52  Seed:6  PR:7 | 5 | (Zhou et al., 2014) |
|  | 1500 | Geochemical model | 9 | (Yu et al., 2007) |
| 33 | Chaka Salt Lake | 36.7 | 99.1 | 3200 | Quaternary sediment;  Carbonate;  Calcareous mudstone;  Sandstone | 0-1.6 | 1700 | Bulk:10 | 6（YD） | (Liu et al., 2008a) |
| 34 | Lake Dalianhai | 36.24 | 100.4 | 2850 | Quaternary sediment;  Limestone;  Sandstone;  Marble | 0-3 | 675 (Surface);  385 (Bottom) | PR:23 | 7 | (Chen et al., 2012) |
| 35 | Lake Gahai | 37.13 | 97.56 | 3480 | Quaternary sediment | 0-3 | 4522;  5128 | Carbonate:28;  Mollusk shell:4 | 5 | (Zhang et al., 2016b) |
| 36 | Lake Hala | 38.33 | 97.5 | 4078 | Siltstone;  Sandstone;  Slate;  quartz-schist;  Conglomerates;  Breccia;  Limestone;  Marlstone;  Dolostone;  Quaternary sediment | 4-16 | 1000 | Bulk:19  PR:3 | 3 | (Wuennemann et al., 2012) |
| 37 | Lake Sugan | 38.85 | 93.9 | 2795 | Sandstone;  Conglomerate;  Quaternary sediment |  | 2200 | PR:5  (Ruppia seed:4) | 4,5 | (Qiang et al., 2005) |
|  | 2592-4340 | PR:1;  Seed:4 | 8 | (Zhou et al., 2009) |
| 38 | Hurleg lake | 37.28 | 96.90 | 2817 | Sandstone;  Quaternary sediment | 2-16 |  | Plant Macrofossils:7 | 0 | (Zhao et al., 2007) |
|  | 3640 | Macrophytes:2;  TOC: 3 | 5 | (Song et al., 2020) |
| 39 | Kusai Lake | 35.62 | 93.63 | 4475 | Sandy slate;  Quaternary alluvium | 0-2 | 3400 | TOC:7 | 4 | (Liu et al., 2009) |
|  | 2980-3310  4010 | TOC:27 | 8 | (Zhang et al., 2021) |
| 40 | Lake Donggi Cona | 35.30 | 98.44 | 4090 | Limestone;  Clastic rocks;  Quaternary sediment |  | 1655 | TOC:13  Humic:4  Humin:3 | 3 | (Mischke et al., 2010) |
| 0.4-2.2 | 2090 | Bulk:29 | 3 | (Opitz et al., 2012) |
| 41 | Buruo Co | 34.33 | 85.70 | 5170 | Carbonate;  Granite | 0.2-1.4 | 3856 | Bulk:15 | 4 | (Xu et al., 2019) |
| 42 | Linggo CO | 33.80 | 88.51 | 5059 | Clastic carbonates;  Limestone |  | 600 | Algae:1  Shrimp:1;  Plant remains:2;  TOC:21 | 7 | (Hu et al., 2018) |
| 5-19 | 1611 | TOC:27;  PR:2 | 7 | (Hou et al., 2017a) |
| 43 | Chibuzhang Co | 33.31 | 90.01 | 4941 | Sandstone; siltite; Carbonates; volcanic rock | 0.2-1.8 | 3488(below 510cm)  2380(0-510cm) | TOC:20  Plant remains:3 | 4,5 | (Mischke et al., 2019) |
| 44 | Zigetang Co | 32.10 | 90.80 | 4561 | Slate; Quaternary alluvial sediment;  Limestone |  | 2060 | Bulk:13 | 3 | (Jin et al., 2016) |
| 45 | Dagze Co | 31.81 | 87.41 | 4450 | Granite; limestone |  | 1693 | Bulk:9 | 5 | (Hou et al., 2017b) |
| 46 | Selin Co | 31.75 | 89.31 | 4542 | Limestone;  Sandstone;  Siliceous;  Lyddite;  Quartzite;  Volcanic;  Basaltic | 0.52-1.56 | 2635 | Bulk:15 | 5 | (Gyawali et al., 2019) |
| 47 | Jiang Co | 31.55 | 90.81 | 4603 | Sandstone;  Quaternary sediment; granite |  | 2290 | Bulk:7 | 5 | (Hou et al., 2017b) |
|  | 3473 | TOC:3 | 5 | (Ji et al., 2021) |
| 48 | Lake Cuoe | 31.40 | 91.50 | 4532 | Sandstone;  Granite;  Imestones；  Dolerite;  Quaternary alluvium | 0-6 | 3470 | Bulk:10;  Plant remains:3 | 3 | (Wu et al., 2006) |
|  | 3260 | TOC:10  PR:3 | 3 | (Wu et al., 2010) |
| 49 | Tangra Yumco | 31.03 | 86.50 | 4545 | Quaternary sediment;  Magmatic rocks | 0.1-1.2 | 2070 | Bulk:22  Wood:1  PR:1 | 2 | (Henkel et al., 2016) |
|  | 2255 | TOC:8  Plant residue:6 | 3 | (Wang et al., 2017) |
| 50 | Num Co | 30.70 | 90.70 | 4718 | Granitoids;  Orthogneisses;  Limestones;  Sandstones;  Conglomerates | 0.3-2.2 | 949-2476  (Variable with location) | Bulk:11 | 4 | (Kasper et al., 2012) |
| 51 | Mapam Yumco | 30.56 | 81.44 | 4572 | Siliceous;  Limestone;  Volcanic | 1.2-2.1 | 638 | TOC:15 | 4 | (Zhu et al., 2019) |
| 52 | Lake Pumoyum | 28.55 | 90.43 | 5030 | Metamorphic rock; Quaternary sediment | 0-6 | 1152 | PR:18;  Aquatic plant residues:12 | 4 | (Lu et al., 2011) |
| 53 | Aweng Co | 32.7 | 81.63 | 4427 | Granite; Quaternary sediment |  | 4066(0 cm-309 cm);  3227(below 309 cm) | Bulk:7 | 5 | (Li et al., 2017) |

# Outflow lake

## Northeast and North central China

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Lake name | Latitude  (°N) | Longitude  (°E) | Altitude  （m） | Bedrock | TOC  (%) | Reservoir Age (14C years BP) | Dating  materials: amount | Method | References |
| 54 | Lake Jingbo | 43.59 | 129.03 | 350 | Basalt;  Quaternary sediment;  Granite |  | 225 | TOC:7 | 4 | (Hou et al., 2006)  (Li et al., 2011) |
| 0-8 | 740-1380 | PR:9;  TOC:4 | 7 | (Chen et al., 2015b) |
| 55 | Baiyangdian | 38.87 | 115.89 | 29 | Quaternary sediment |  | 35 | PR:4;  mollusk shell:3;  mussel:1 | 5 | (Shen et al., 2018) |
| 56 | Lake Dongping | 35.98 | 116.19 | 40 | Quaternary sediment |  | 980-1900 | TOC:7 | 3 | (Yang et al., 2014) |
| Gneiss |  | 2345 | DIC:1 | 2 |  |
| Limestone |  | 484 | PR:1 |  |  |

## Southeat and Southwest China

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Lake name | Latitude  (°N) | Longitude  (°E) | Altitude  （m） | Bedrock | TOC  (%) | Reservoir Age (14C years BP) | Dating  materials: amount | Method | References |
| 57 | Lake Nanyi | 31.15 | 119.05 | 2.2 | Sandstone;  Shale;  Limestone |  | 40 | PR:4;  TOC:3 | 7 | (Liu et al., 2018) |
| 58 | Lake Longgan | 29.91 | 116.02 | 12 | Quaternary sediment | 0-4 |  | TOC:5 | 1 | (Xue et al., 2017) |
| 59 | Lake Poyang | 29.15 | 116.41 | 21 | Sandstone;  Quaternary sediment | 0.2-1.6 | 560 | Wood:2;  TOC:5 | 7 | (Li et al., 2016b) |
| 60 | Lake Shudu | 27.91 | 99.95 | 3630 | Quartzite;  Schist;  Limestone;  Sandstone;  Quaternary sediment | 4-10 |  | TOC:17;  Pollen:4 | 1 | (Cook et al., 2013) |
| 64 | Tiancai Lake | 26.63 | 99.72 | 3898 | Magmatite;  Sandstone | 4.7-41.9 |  | PR:15;  TOC:3 | 1 | (Xiao et al., 2014) |
| 62 | Erhai Lake | 25.8 | 100.18 | 1937.7 | Carbonate;  Gneisses;  Silicite | 1.13-4.20 |  | PR:7  Cellulose:14 | 0 | (Tareq et al., 2011) |
|  | 523-610 | TOC:2;  Snail shell:2;  Pondweed:1;  Snail(modern):1  DOC:1 | 2 | (Xu et al., 2015) |
| 63 | Dianchi lake | 25.06 | 102.68 | 1886 | Sandstone;  Limestone | 10-20 |  | Charcoal:5;  Wood:4;  Seed:1 | 0 | (Xiao et al., 2020) |
| 64 | Fuxian lake | 24.42 | 102.86 | 1721 | Sandstone;  Limestone;  Basalt | 0-7 | 160 | TOC:6;  Aquatic :1 | 4 | (Liu et al., 2017) |
| 65 | Xingyun lake | 24.34 | 102.78 | 1723 | Sandstone;  shaleslate;  Limestone;  Dolomite;  Phyllite |  | 1100 | Wood:3;  Charcoal:6;  Leaf:3;  Gastropod Shell:3 | 7 | (Hillman et al., 2017) |
| 0-14 | 1200 | TOC:8 | 5 | (Zhang et al., 2014) |
| 5-25 | 960-2200 | Twigs:8;  TOC:8;  Gastropod:1 | 7 | (Zhou et al., 2015) |

## Northwest China

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Lake name | Latitude  (°N) | Longitude  (°E) | Altitude  （m） | Bedrock | TOC  (%) | Reservoir Age (14C years BP) | Dating  materials:  amount | Method | References |
| 66 | Lake Bosten | 42 | 87 | 1048 | Quaternary sediment |  | 1140 | PR:3  TOC:5 | 7 | (Huang et al., 2007) |
| 1-4 | 3464 | Carbonate :18  PR:3 | 5 | (Zhang et al., 2016b) |

## Tibetain Plateau

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Lake name | Latitude  (°N) | Longitude  (°E) | Altitude  （m） | Bedrock | TOC  (%) | Reservoir Age (14C years BP) | Dating materials: amount | Method | References |
| 67 | Luanhaizi Lake | 37.59 | 101.2 | 3200 | Quaternary sediment | <17 | 800 | aquatic macrophytes: 4;  mollusc shells: 4 | 2 | (Mischke et al., 2005)  (Herzschuh et al., 2005) |
| 68 | Kalakuli Lake | 38.43 | 75.03 | 3645 | Granite;  Schist;  Quaternary sediment |  | 1880 | TOC:17 | 4 | (Liu et al., 2014) |
| 69 | Lake Heihai | 36.00 | 93.15 | 4420 | Slates;  Sandstones;  Conglomerates;  Limestone;  Dolomite |  | 6465 | Plant remains:19;  Profile samples:12;  Living plants:4 | 2 | (Lockot et al., 2015) |
| 70 | Bangong Co | 33.70 | 79.20 | 4217 | Limestone;  Quaternary sediment;  Dolomite;  Sandstone |  | 6670 | Carbonate :15;  TOC: 3;  Aquatic plants: 2;  Shell: 3;  Ostracods: 2 | 5 | (Fontes et al., 1996) |
|  | 4877 | PR:4;  TOC:15 | 5 | (Hou et al., 2017a) |
| 71 | Lake Koucha | 34.01 | 97.24 | 4530 | Granite;  Sandstone | 0-24 |  | Pollen:4;  Alkali soluble fraction: 1;  Alkali insoluble fraction: 1 | 0 | (Mischke et al., 2008) |
| 72 | Ahung Co | 31.62 | 92.06 | 4575 | Quartzite,;  Shale;  Dolomite |  | 680 | Aquatic plant:3;  TOC: 3;  charcoal:6;  PR:50 | 2 | (Morrill et al., 2006) |
| 73 | Basomtso Lake | 30.00 | 93.89 | 3476 | Granite;  Amphibolite | 0.2-1.8 |  | Leaves:6 | 0 | (Li et al., 2016a) |
| 74 | Paru Co | 29.77 | 92.35 | 4845 | Andesite | 10-55 |  | charcoal:7  oogonia:1 | 0 | (Bird et al., 2014) |
| 75 | Laigu lake | 29.30 | 96.83 | 3978 | Calcareous slate;  Granite;  Quaternary sediment |  | 2852 | TOC:11 | 5 | (Huang et al., 2016) |
| 76 | Lake Ximencuo | 33.38 | 101.1 | 4000 | Granite | 0-12.5 | 781 | TOC:15  Humic:10 | 3 | (Zhang and Mischke, 2009) |
| 77 | Lake Naleng | 31.1 | 99.75 | 4200 | Limestone;  Sandstone | 0-7.5 | 1560 | Humic: 9  Humin: 9 | 5 | (Kramer et al., 2010) |
| 78 | Wuxu lake | 29.15 | 101.41 | 3715 | Slate;  Schist;  granite |  |  | Plant macrofossils:18 | 0 | (Zhang et al., 2016a) |
| 79 | Qiangyong Co | 28.88 | 90.22 | 4875 | Limestone;  Carbonaceous slate; Granite;  Moraines |  | 23585-26490 | Bulk:6;  Pollen:17;  PR:14 | 5 | (Zhang et al., 2017) |
| 80 | Muge Co | 30.13 | 101.83 | 3780 | Granite;  Quaternary sediment |  |  | Bulk:7;  pollen:1 | 0 | (Ni et al., 2019) |
| 81 | Lake Ruogen Co | 30.15 | 99.73 | 4315 | Granite;  Limestone;  Quaternary sediment |  | 2137 | Bulk:11;  Surface water DIC:1 |  | (Ming et al., 2020a) |

**Supplementary material references**

An, C., Lu, Y., Zhao, J., Tao, S., Dong, W., Li, H., Jin, M., Wang, Z., 2012. A high-resolution record of Holocene environmental and climatic changes from Lake Balikun (Xinjiang, China): Implications for central Asia. *Holocene* 22, 43-52.

Bird, B.W., Polisar, P.J., Lei, Y., Thompson, L.G., Yao, T., Finney, B.P., Bain, D.J., Pompeani, D.P., Steinman, B.A., 2014. A Tibetan lake sediment record of Holocene Indian summer monsoon variability. *Earth and Planetary Science Letters* 399, 92-102.

Chen, C., Lan, H.C., Lou, J.Y., Chen, Y.C., 2003. The Dry Holocene Megathermal in Inner Mongolia. *Palaeogeography Palaeoclimatology Palaeoecology* 193, 181-200.

Chen, F., Xu, Q., Chen, J., Birks, H., Liu, J., Zhang, S., Jin, L., An, C., Telford, R., Cao, X., 2015a. East Asian summer monsoon precipitation variability since the last deglaciation. *Scientific Reports* 5, 11186.

Chen, F., Zhang, J., Cheng, B., Yang, T., 2012. Late quaternary high lake levels and environmental changes since last deglacial in Dalianhai, Gonghe Basin in Qinghai Province (in Chinese). *Quaternary Sciences* 32, 122-131.

Chen, R., Shen, J., Li, C., Zhang, E., Sun, W., Ji, M., 2015b. Mid- to late-Holocene East Asian summer monsoon variability recorded in lacustrine sediments from Jingpo Lake, Northeastern China. *Holocene* 25, 454-468.

Cook, C.G., Jones, R.T., Turney, C.S.M., 2013. Catchment instability and Asian summer monsoon variability during the early Holocene in southwestern China. *Boreas* 42, 224-235.

Dodson, J., Li, J., Lu, F., Zhang, W., Yan, H., Cao, S., 2019. A Late Pleistocene and Holocene vegetation and environmental record from Shuangchi Maar, Hainan Province, South China. *Palaeogeography Palaeoclimatology Palaeoecology* 523, 89-96.

Duan, F., An, C., Zhao, Y., Zhang, X., Zhou, A., Huang, X., Li, G., Xia, D., Chen, F., 2018. A preliminary study on the climate change since the last interglaciation based on lake sediments from Xingjiang, Northwest China. *Quaternary Sciences* 38, 1156-1165.

Fan, J., Xiao, J., Wen, R., Zhang, S., Wang, X., Cui, L., Yamagata, H., 2017. Organic geochemical investigations of the Dali Lake sediments in northern China: Implications for environment and climate changes of the last deglaciation in the East Asian summer monsoon margin. *Journal of Asian Earth Sciences* 140, 135-146.

Fontes, J.C., Gasse, F., Gibert, E., 1996. Holocene environmental changes in Lake Bangong basin (western Tibet) .1. Chronology and stable isotopes of carbonates of a Holocene lacustrine core. *Palaeogeography Palaeoclimatology Palaeoecology* 120, 25-47.

Guo, S., Wang, S., Yang, L., 2005. Climatic and Environmental Change in North China Plain during the Last Glacial Maximum (in chinese). *Geological Review* 51, 423-427.

Gyawali, A.R., Wang, J., Ma, Q., Wang, Y., Xu, T., Guo, Y., Zhu, L., 2019. Paleo-environmental change since the Late Glacial inferred from lacustrine sediment in Selin Co, central Tibet. *Palaeogeography, Palaeoclimatology, Palaeoecology* 516, 101-112.

Henkel, K., Haberzettl, T., St-Onge, G., Wang, J., Ahlborn, M., Daut, G., Zhu, L., Maeusbacher, R., 2016. High-resolution paleomagnetic and sedimentological investigations on the Tibetan Plateau for the past 16 ka cal BPThe Tangra Yumco record. *Geochemistry Geophysics Geosystems* 17, 774-790.

Herzschuh, U., Zhang, C.J., Mischke, S., Herzschuh, R., Mohammadi, F., Mingram, B., Kurschner, H., Riedel, F., 2005. A late Quaternary lake record from the Qilian Mountains (NW China): evolution of the primary production and the water depth reconstructed from macrofossil, pollen, biomarker, and isotope data. *Global and Planetary Change* 46, 361-379.

Hillman, A.L., Abbott, M.B., Finkenbinder, M.S., Yu, J., 2017. An 8,600 year lacustrine record of summer monsoon variability from Yunnan, China. *Quaternary Science Reviews* 174, 120-132.

Hillman, A.L., Abbott, M.B., Yu, J., Steinman, B.A., Bain, D.J., 2016. The isotopic response of Lake Chenghai, SW China, to hydrologic modification from human activity. *Holocene*, 0959683615622553.

Hillman, A.L., O’Quinn, R.F., Abbott, M.B., Bain, D.J., 2020. A Holocene history of the Indian monsoon from Qilu Lake, southwestern China. *Quaternary Science Reviews* 227.

Hodell, D.A., Brenner, M., Kanfoush, S.L., Curtis, J.H., Stoner, J.S., Song, X., Yuan, W., Whitmore, T.J., 1999. Paleoclimate of Southwestern China for the Past 50,000 yr Inferred from Lake Sediment Records. *Quaternary Research* 52, 369-380.

Hou, J., D'Andrea, W.J., Wang, M., He, Y., Liang, J., 2017a. Influence of the Indian monsoon and the subtropical jet on climate change on the Tibetan Plateau since the late Pleistocene. *Quaternary Science Reviews* 163, 84-94.

Hou, J.Z., Tian, Q., Liang, J., Wang, M.D., He, Y., 2017b. Climatic implications of hydrologic changes in two lake catchments on the central Tibetan Plateau since the last glacial. *Journal of Paleolimnology* 58, 257-273.

Hou, X., Wu, Y., Yang, L., 2006. The paleo-precipitation history recorded by the characteristics of grain-size of Lake Jingpo during Holocene. *Scientia Limnologica Sinica* 18, 605-614.

Hu, G., Yi, C., Zhang, J., Cao, G., Pan, B., Liu, J., Jiang, T., Yi, S., Li, D., Huang, J., 2018. Chronology of a lacustrine core from Lake Linggo Co using a combination of OSL, 14C and 210Pb dating: implications for the dating of lacustrine sediments from the Tibetan Plateau. *Boreas* 47, 656-670.

Huang, L., Zhu, L., Wang, J., Ju, J., Wang, Y., Zhang, J., Yang, R., 2016. Glacial activity reflected in a continuous lacustrine record since the early Holocene from the proglacial Laigu Lake on the southeastern Tibetan Plateau. *Palaeogeography Palaeoclimatology Palaeoecology* 456, 37-45.

Huang, X.Z., Chen, F.H., Fan, Y.X., Yang, M.L., 2007. Dry late-glacial and early Holocene climate in arid central Asia indicated by lithological and palynological evidence from Bosten Lake, China. *Quaternary International* 194, 19-27.

Ji, K., Zhu, E., Chu, G., Hou, J., 2021. Precipitation record based on varve chronology in Jiang Co on the central Tibetan Plateau during the past 2000 years（in Chinese）. *Quaternary Science* 41, 424-433.

Jia, G., Bai, Y., Yang, X., Xie, L., Wei, G., Ouyang, T., Chu, G., Liu, Z., Peng, P.a., 2015. Biogeochemical evidence of Holocene East Asian summer and winter monsoon variability from a tropical maar lake in southern China. *Quaternary Science Reviews* 111, 51-61.

Jiang, Q., Jin, d., Zheng, J., Yang, Y., 2019. Aburupt climate events record by Sayram Lake sediments since the last deglaciation. *Quaternary Sciences* 39, 952-963.

Jiang, W., Guo, Z., Sun, X., Wu, H., Chu, G., Yuan, B., Hatté, C., Guiot, J., 2006. Reconstruction of climate and vegetation changes of Lake Bayanchagan (Inner Mongolia): Holocene variability of the East Asian monsoon. *Quaternary Research* 65, 411-420.

Jin, C., Guenther, F., Li, S., Jia, G., Peng, P.a., Gleixner, G., 2016. Reduced early Holocene moisture availability inferred from dD values of sedimentary n-alkanes in Zigetang Co, Central Tibetan Plateau. *Holocene* 26, 556-566.

Kasper, T., Haberzettl, T., Doberschuetz, S., Daut, G., Wang, J., Zhu, L., Nowaczyk, N., Maeusbacher, R., 2012. Indian ocean summer monsoon (IOSM)-dynamics within the past 4 ka recorded in the sediments of Lake Nam Co, central Tibetan Plateau (China). *Quaternary Science Reviews* 39, 73-85.

Kramer, A., Herzschuh, U., Mischke, S., Zhang, C., 2010. Late glacial vegetation and climate oscillations on the southeastern Tibetan Plateau inferred from the Lake Naleng pollen profile. *Quaternary Research* 73, 324-335.

Li, C., Wu, Y., Hou, X., 2011. Holocene vegetation and climate in Northeast China revealed from Jingbo Lake sediment. *Quaternary International* 229, 67-73.

Li, G., Wang, Z., Zhao, W., Jin, M., Wang, X., Tao, S., Chen, C., Cao, X., Zhang, Y., Yang, H., Madsen, D., 2020. Quantitative precipitation reconstructions from Chagan Nur revealed lag response of East Asian summer monsoon precipitation to summer insolation during the Holocene in arid northern China. *Quaternary Science Reviews* 239.

Li, J., Liu, X., 2018. Orbital- and suborbital-scale changes in the East Asian summer monsoon since the last deglaciation. *Holocene*, 095968361877147.

Li, K., Liu, X., Herzschuh, U., Wang, Y., 2016a. Rapid climate fluctuations over the past millennium: evidence from a lacustrine record of Basomtso Lake, southeastern Tibetan Plateau. *Scientific Reports* 6.

Li, X., Wang, M., Zhang, Y., Lei, L., Hou, J., 2017. Holocene climatic and environmental change on the western Tibetan Plateau revealed by glycerol dialkyl glycerol tetraethers and leaf wax deuterium-to-hydrogen ratios at Aweng Co. *Quaternary Research* 87, 455-467.

Li, X., Yang, H., Yao, Y., Chen, Y., Liu, W., 2016b. Precipitation changes recorded in the sedimentary total organic carbon isotopes from Lake Poyang in the Middle and Lower Yangtze River, southern China over the last 1600 years. *Quaternary International* 425, 292-300.

Ling, Y., Tang, W., Wang, Y., Tian, F., Yuan, L., Ye, M., 2020. Evidence of Abrupt Climate Change during the Mid- to Late-Holocene Recorded in a Tropical Lake, Southern China. *Acta Geologica Sinica-English Edition* 94, 1187-1193.

Liu, F., Hu, J., Wang, W., Tong, X., Huang, C., Liao, W., 2018. Variations in the distribution and compound-specific stable carbon isotopic compositions of n-alkanes recorded in Lake Nanyi sediments from the Middle-Lower Yangtze Region since 8.0 ka BP and implications for the Paleoclimate. *Geochimica* 47, 89-101.

Liu, J., Wang, R., Zhao, Y., Yang, Y., 2019. A 40,000-year record of aridity and dust activity at Lop Nur, Tarim Basin, northwestern China. *Quaternary Science Reviews* 211, 208-221.

Liu, X., Dong, H., Rech, J.A., Matsumoto, R., Bo, Y., Wang, Y., 2008a. Evolution of Chaka Salt Lake in NW China in response to climatic change during the Latest Pleistocene-Holocene. *Quaternary Science Reviews* 27, 867-879.

Liu, X., Dong, H., Yang, X., Herzschuh, U., Zhang, E., Stuut, J.-B.W., Wang, Y., 2009. Late Holocene forcing of the Asian winter and summer monsoon as evidenced by proxy records from the northern Qinghai-Tibetan Plateau. *Earth and Planetary Science Letters* 280, 276-284.

Liu, X., Herzschuh, U., Shen, J., Jiang, Q., Xiao, X., 2008b. Holocene environmental and climatic changes inferred from Wulungu Lake in northern Xinjiang, China. *Quaternary Research* 70, 412-425.

Liu, X., Herzschuh, U., Wang, Y., Kuhn, G., Yu, Z., 2014. Glacier fluctuations of Muztagh Ata and temperature changes during the late Holocene in westernmost Tibetan Plateau, based on glaciolacustrine sediment records. *Geophysical Research Letters* 41, 6265-6273.

Liu, Y., Sun, H., Zhou, X., Duan, L., Li, H., Zhang, H., 2017. Paleoenvironmental significance of organic carbon isotope in lacustrine sediments in Lake Fuxian during the past 5 ka (in Chinese). *Journal of Lake Sciences* 29, 722-729.

Lockot, G., Ramisch, A., Wuennemann, B., Hartmann, K., Haberzettl, T., Chen, H., Diekmann, B., 2015. A process and provenance-based attempt to unravel incosistent radiocarbon chronologies in lake sediments: an example from lake Helhai, North Tibetan Plateau (China). *Radiocarbon* 57, 1003-1019.

Long, H., Lai, Z., Wang, N., Zhang, J., 2011. A combined luminescence and radiocarbon dating study of Holocene lacustrine sediments from arid northern China. *Quaternary Geochronology* 6, 1-9.

Lu, X., Zhu, L., Nishimura, M., Morita, Y., Watanabe, T., Nakamura, T., Wang, Y., 2011. A high-resolution environmental change record since 19 cal ka BP in Pumoyum Co, southern Tibet. *Chinese Science Bulletin* 56, 2931-2940.

Ming, G., Zhou, W., Cheng, P., Wang, H., Xian, F., Fu, Y., Wu, S., Du, H., 2020a. Lacustrine record from the eastern Tibetan Plateau associated with Asian summer monsoon changes over the past similar to 6 ka and its links with solar and ENSO activity. *Climate Dynamics* 55, 1075-1086.

Ming, G., Zhou, W., Wang, H., Cheng, P., Shu, P., Xian, F., Fu, Y., 2020b. Moisture variations in Lacustrine-eolian sequence from the Hunshandake sandy land associated with the East Asian Summer Monsoon changes since the late Pleistocene. *Quaternary Science Reviews* 233.

Mischke, S., Aichner, B., Diekmann, B., Herzschuh, U., Plessen, B., Wuennemann, B., Zhang, C., 2010. Ostracods and stable isotopes of a late glacial and Holocene lake record from the NE Tibetan Plateau. *Chemical Geology* 276, 95-103.

Mischke, S., Herzschuh, U., Zhang, C., Bloemendal, J., Riedel, F., 2005. A late Quaternary lake record from the Qilian mountains (NW China): lake level and salinity changes inferred from sediment properties and ostracod assemblages. *Glob. Planet. Change* 46, 337-359.

Mischke, S., Kramer, M., Zhang, C., Shang, H., Herzschuh, U., Erzinger, J., 2008. Reduced early Holocene moisture availability in the Bayan Har Mountains, northeastern Tibetan Plateau, inferred from a multi-proxy lake record. *Palaeogeography Palaeoclimatology Palaeoecology* 267, 59-76.

Mischke, S., Zhang, C., Liu, C., Zhang, J., Jiao, P., Plessen, B., 2019. The Holocene salinity history of Lake Lop Nur (Tarim Basin, NW China) inferred from ostracods, foraminifera, ooids and stable isotope data. *Global and Planetary Change* 175, 1-12.

Morrill, C., Overpeck, J.T., Cole, J.E., Liu, K.B., Shen, C.M., Tang, L.Y., 2006. Holocene variations in the Asian monsoon inferred from the geochemistry of lake sediments in central Tibet. *Quaternary Research* 65, 232-243.

Ni, Z., Jones, R., Zhang, E., Chang, J., Shulmeister, J., Sun, W., Wang, Y., Ning, D., 2019. Contrasting effects of winter and summer climate on Holocene montane vegetation belts evolution in southeastern Qinghai-Tibetan Plateau, China. *Palaeogeography Palaeoclimatology Palaeoecology* 533.

Opitz, S., Wuennemann, B., Aichner, B., Dietze, E., Hartmann, K., Herzschuh, U., Ijmker, J., Lehmkuhl, F., Li, S., Mischke, S., Plotzki, A., Stauch, G., Diekmann, B., 2012. Late Glacial and Holocene development of Lake Donggi Cona, north-eastern Tibetan Plateau, inferred from sedimentological analysis. *Palaeogeography Palaeoclimatology Palaeoecology* 337, 159-176.

Ouyang, C., Zhang, H., Chang, F., Li, H., Che, Y., Zhang, Y., Duan, L., Ren, Y., 2019. The Rb/Sr Ratio Response to Paleo Precipitation Recorded by Lake Sediment from a Semi Closed Lake in Southwest China since 16.0 cal. ka BP. *Ekoloji* 28, 3901-3912.

Peng, J., Yang, X., L.Toney, J., Ruan, J., Li, G., Zhou, Q., Gao, H., Xie, Y., Chen, Q., Zhang, T., 2019. Indian Summer Monsoon variations and competing influences between hemispheres since ~35ka recorded in Tengchongqinghai Lake, southwestern China. *Palaeogeography, Palaeoclimatology, Palaeoecology* 516, 113-125.

Qiang, L., Qian, L., Luo, W., Guoqiang, C., 2010. Stable carbon isotope record of bulk organic matter from a sediment core at Moon Lake in the middle part of the Daxing'an Mountain range (in Chinese). *Quaternary Science* 30, 1069-1077.

Qiang, M., Chen, F., Zhang, J., Gao, S., Zhou, A., 2005. Climate Change Recorded by Stable Isotopes of Carbonate Deposits in Sugan Lake in the Past Two Thousand Years (in Chinese). *Chinese science bulletin* 50, 1385-1393.

Quan, M., Gao, Y., Xiong, K., Lv, Y., Shen, W., 2019. Paleoclimate Change of the Fanjingshan World Natural Heritage Property since Holocene (in Chinese). *Earth and Environment* v.47;No.331, 39-49.

Schettler, G., Liu, Q., Mingram, J., Stebich, M., Dulski, P., 2006. East-Asian monsoon variability between 15 000 and 2000 cal. yr BP recorded in varved sediments of Lake Sihailongwan (northeastern China, Long Gang volcanic field). *Holocene* 16, 1043-1057.

Shen, G., Ding, G., Yang, X., Zhang, R., Li, Y., Li, B., 2018. Holocene climate and environmental change in the Baiyangdian Area. *Quaternary Sciences* 38, 756-768.

Sheng, E., Yu, K., Xua, H., Lan, J., Liu, B., Che, S., 2015. Late Holocene Indian summer monsoon precipitation history at Lake Lugu, northwestern Yunnan Province, southwestern China. *Palaeogeography, Palaeoclimatology, Palaeoecology*.

Song, G., Wang, H., Shi, L., 2020. Climate evolution since 9.32 cal ka BP in Keluke Lake, northeastern Qaidam Basin, China. *Journal of Arid Environments* 178.

Song, X.Y., Yao, Y.F., Wortley, A.H., Paudayal, K.N., Blackmore, S., 2012. Holocene vegetation and climate history at Haligu on the Jade Dragon Snow Mountain, Yunnan, SW China. *Climatic Change* 113, 841-866.

Stebich, M., Rehfeld, K., Schlütz, F., Tarasov, P.E., Liu, J., Mingram, J., 2015. Holocene vegetation and climate dynamics of NE China based on the pollen record from Sihailongwan Maar Lake. *Quaternary Science Reviews* 124, 275-289.

Sun, A., Feng, Z., 2013. Holocene climatic reconstructions from the fossil pollen record at Qigai Nuur in the southern Mongolian Plateau. *Holocene* 23, 1391-1402.

Sun, Q., Chu, G., Xie, M., Zhu, Q., Su, Y., Wang, X., 2018. An oxygen isotope record from Lake Xiarinur in Inner Mongolia since the last deglaciation and its implication for tropical monsoon change. *Global Planetary Change*, 109-117.

Sun, W., Zhang, E., Shulmeister, J., Bird, M.I., Shen, J., 2019. Abrupt changes in Indian summer monsoon strength during the last deglaciation and early Holocene based on stable isotope evidence from Lake Chenghai, southwest China. *Quaternary Science Reviews* 218, 1-9.

Tang, L., Wang, X.S., Zhang, S.Q., Chu, G.Q., Chen, Y., Pei, J.L., Sheng, M., Yang, Z.Y., 2015. High-resolution magnetic and palynological records of the last deglaciation and Holocene from Lake Xiarinur in the Hunshandake sandy land, Inner Mongolia. *Holocene* 25, 844-856.

Tao, S., An, C., Chen, F., Tang, L., Wang, Z., Lue, Y., Li, Z., Zheng, T., Zhao, J., 2010. Pollen-inferred vegetation and environmental changes since 16.7 ka BP at Balikun Lake, Xinjiang. *Chinese Science Bulletin* 55, 2449-2457.

Tareq, S.M., Kitagawa, H., Ohta, K., 2011. Lignin biomarker and isotopic records of paleovegetation and climate changes from Lake Erhai, southwest China, since 18.5 ka BP. *Quaternary International* 229, 47-56.

Wang, J., Zhu, L., Wang, Y., Peng, P., Ma, Q., Haberzettl, T., Kasper, T., Matsunaka, T., Nakamura, T., 2017. Variability of the C-14 reservoir effects in Lake Tangra Yumco, Central Tibet (China), determined from recent sedimentation rates and dating of plant fossils. *Quaternary International* 430, 3-11.

Wang, N., Zong, Y., Brodie, C.R., Zheng, Z., 2014a. An examination of the fidelity of n-alkanes as a palaeoclimate proxy from sediments of Palaeolake Tianyang, South China. *Quaternary International* 333, 100-109.

Wang, Q., Anderson, N.J., Yang, X., Xu, M., 2020. Interactions between climate change and early agriculture in SW China and their effect on lake ecosystem functioning at centennial timescales over the last 2000 years. *Quaternary Science Reviews* 233.

Wang, Q., Yang, X., Anderson, N.J., Zhang, E., Li, Y., 2014b. Diatom response to climate forcing of a deep, alpine lake (Lugu Hu, Yunnan, SW China) during the Last Glacial Maximum and its implications for understanding regional monsoon variability. *Quaternary Science Reviews*

86, 1-12.

Wang, W., Feng, Z., Ran, M., Zhang, C., 2013. Holocene climate and vegetation changes inferred from pollen records of Lake Aibi, northern Xinjiang, China: A potential contribution to understanding of Holocene climate pattern in East-central Asia. *Quaternary International* 311, 54-62.

Wang, X., Chu, G., Sheng, M., Zhang, S., Li, J., Chen, Y., Tang, L., Su, Y., Pei, J., Yang, Z., 2016. Millennial-scale Asian summer monsoon variations in South China since the last deglaciation. *Earth and Planetary Science Letters* 451, 22-30.

Wei, Z., Zhong, W., Shang, S., Ye, S., Tang, X., Xue, J., Ouyang, J., Smol, J.P., 2018. Lacustrine mineral magnetic record of postglacial environmental changes from Dahu Swamp, southern China. *Global and Planetary Change* 170, 62-75.

Wen, R., Xiao, J., Chang, Z., Zhai, D., Xu, Q., Li, Y., Itoh, S., Lomtatidze, Z., 2010. Holocene climate changes in the mid-high-latitude-monsoon margin reflected by the pollen record from Hulun Lake, northeastern Inner Mongolia. *Quaternary Research* 73, 293-303.

Wu, Y., Li, S., Luecke, A., Wuennemann, B., Zhou, L., Reimer, P., Wang, S., 2010. Lacustrine radiocarbon reservoir ages in Co Ngoin and Zige Tangco, central Tibetan Plateau. *Quaternary International* 212, 21-25.

Wu, Y., Luecke, A., Jin, Z., Wang, S., Schleser, G.H., Battarbee, R.W., Xia, W., 2006. Holocene climate development on the central Tibetan Plateau: A sedimentary record from Cuoe Lake. *Palaeogeography Palaeoclimatology Palaeoecology* 234, 328-340.

Wuennemann, B., Wagner, J., Zhang, Y., Yan, D., Wang, R., Shen, Y., Fang, X., Zhang, J., 2012. Implications of diverse sedimentation patterns in Hala Lake, Qinghai Province, China for reconstructing Late Quaternary climate. *Journal of Paleolimnology* 48, 725-749.

Xiao, J., Chang, Z., Wen, R., Zhai, D., Itoh, S., Lomtatidze, Z., 2009. Holocene weak monsoon intervals indicated by low lake levels at Hulun Lake in the monsoonal margin region of northeastern Inner Mongolia, China. *Holocene* 19, 899-908.

Xiao, J., Wu, J., Si, B., Liang, W., Nakamura, T., Liu, B., Inouchi, Y., 2006. Holocene climate changes in the monsoon/arid transition reflected by carbon concentration in Daihai Lake of Inner Mongolia. *Holocene* 16, 551-560.

Xiao, J., Xu, Q., Nakamura, T., Yang, X., Liang, W., Inouchi, Y., 2004. Holocene vegetation variation in the Daihai Lake region of north-central China: a direct indication of the Asian monsoon climatic history. *Quaternary Science Reviews* 23, 1669-1679.

Xiao, X., Haberle, S.G., Li, Y.L., Liu, E., Shen, J., Zhang, E., Yin, J., Wang, S., 2017. Evidence of Holocene climatic change and human impact in northwestern Yunnan Province: High-resolution pollen and charcoal records from Chenghai Lake, southwestern China. *Holocene*, 28, 127-139.

Xiao, X., Haberle, S.G., Shen, J., Yang, X., Han, Y., Zhang, E., Wang, S., 2014. Latest Pleistocene and Holocene vegetation and climate history inferred from an alpine lacustrine record, northwestern Yunnan Province, southwestern China. *Quaternary Science Reviews* 86, 35-48.

Xiao, X., Yao, A., Hillman, A., Shen, J., Haberle, S.G., 2020. Vegetation, climate and human impact since 20 ka in central Yunnan Province based on high-resolution pollen and charcoal records from Dianchi, southwestern China. *Quaternary Science Reviews* 236.

Xu, H., Zhou, X.Y., Lan, J.H., Liu, B., Sheng, E.G., Yu, K.K., Cheng, P., Wu, F., Hong, B., Yeager, K.M., Xu, S., 2015. Late Holocene Indian summer monsoon variations recorded at Lake Erhai, Southwestern China. *Quaternary Research* 83, 307-314.

Xu, T., Zhu, L., Lu, X., Ma, Q., Wang, J., Ju, J., Huang, L., 2019. Mid- to late-Holocene paleoenvironmental changes and glacier fluctuations reconstructed from the sediments of proglacial lake Buruo Co, northern Tibetan Plateau. *Palaeogeography Palaeoclimatology Palaeoecology* 517, 74-85.

Xue, J., Li, J., Dang, X., Meyers, P.A., Huang, X., 2017. Paleohydrological changes over the last 4000 years in the middle and lower reaches of the Yangtze River: Evidence from particle size and n-alkanes from Longgan Lake. *Holocene* 27, 1318-1324.

Xue, J., Zhong, W., 2011. Holocene climate variation denoted by Barkol Lake sediments in northeastern Xinjiang and its possible linkage to the high and low latitude climates. *Science China-Earth Sciences* 54, 603-614.

Yancheva, G., Nowaczyk, N.R., Mingram, J., Dulski, P., Haug, G.H., 2007. Influence of the Intertropical Convergence Zone on the East Asian monsoon. *Nature* 445, 74-77.

Yang, X., Heller, F., Yang, J., Su, Z., 2009. Paleosecular variations since similar to 9000 yr BP as recorded by sediments from maar lake Shuangchiling, Hainan, South China. *Earth and Planetary Science Letters* 288, 1-9.

Yang, Y., Zhang, H., Chang, F., Meng, H., Pan, A., Zheng, Z., Xiang, R., 2016. Vegetation and climate history inferred from a Qinghai Crater Lake pollen record from Tengchong, southwestern China. *Palaeogeography Palaeoclimatology Palaeoecology*, 1-11.

Yang, L., Chen S., 2014. Discussion about the effects and forming times of carbon reservoir of lacustrine sediments in Lake Dongping, North of China. *Advances in Geosciences* 4: 311–318 (in Chinese with English abstract).

Yu, S., Shen, J., Colman, S.M., 2007. Modeling the radiocarbon reservoir effect in lacustrine systems. *Radiocarbon* 49, 1241-1254.

Zhang, C., Mischke, S., 2009. A Lateglacial and Holocene lake record from the Nianbaoyeze Mountains and inferences of lake, glacier and climate evolution on the eastern Tibetan Plateau. *Quaternary Science Reviews* 28, 1970-1983.

Zhang, E., Sun, W., Zhao, C., Wang, Y., Xue, B., Shen, J., 2015. Linkages between climate, fire and vegetation in southwest China during the last 18.5 ka based on a sedimentary record of black carbon and its isotopic composition. *Palaeogeography, Palaeoclimatology, Palaeoecology*.

Zhang, E., Wang, Y., Sun, W., Shen, J., 2016a. Holocene Asian monsoon evolution revealed by a pollen record from an alpine lake on the southeastern margin of the Qinghai-Tibetan Plateau, China. *Climate of the Past* 12, 415-427.

Zhang, J.-F., Xu, B., Turner, F., Zhou, L., Gao, P., Lu, X., Nesje, A., 2017. Long-term glacier melt fluctuations over the past 2500 yr in monsoonal High Asia revealed by radiocarbon-dated lacustrine pollen concentrates. *Geology* 45, 359-362.

Zhang, J., Liu, C., Wu, X., liu, K., Zhou, L., 2012. Optically stimulated luminescence and radiocarbon dating of sediments from Lop Nur (Lop Nor), China. *Quaternary Geochronology*.

Zhang, J., Lu, H., Jia, J., Shen, C., Wang, S., Chu, G., Wang, L., Cui, A., Liu, J., Wu, N., Li, F., 2020. Seasonal drought events in tropical East Asia over the last 60,000 y. *Proceedings of the National Academy of Sciences of the United States of America* 117, 30988-30992.

Zhang, J., Ma, X., Qiang, M., Huang, X., Li, S., Guo, X., Henderson, A.C.G., Holmes, J.A., Chen, F., 2016b. Developing inorganic carbon-based radiocarbon chronologies for Holocene lake sediments in arid NW China. *Quaternary Science Reviews* 144, 66-82.

Zhang, Q., Liu, X., Li, H., 2021. Impact of hydrological conditions on the radiocarbon reservoir effect in lake sediment 14C dating: the case of Kusai Lake on the northern Qinghai-Tibet Plateau. *Quaternary Geochronology* 62, 101149.

Zhang, W., Yan, H., Liu, C., Cheng, P., Li, J., Lu, F., Ma, X., Dodson, J., Heijnis, H., Zhou, W., An, Z., 2018. Hydrological changes in Shuangchi Lake, Hainan Island, tropical China, during the Little Ice Age. *Quaternary International* 487, 54-60.

Zhang, W.X., Ming, Q.Z., Shi, Z.T., Chen, G.J., Niu, J., Lei, G.L., Chang, F.Q., Zhang, H.C., 2014. Lake Sediment Records on Climate Change and Human Activities in the Xingyun Lake Catchment, SW China. *PLoS One* 9, 10.

Zhang, X., Zhou, A., Zhang, C., Hao, S., Zhao, Y., An, C., 2016c. High-resolution records of climate change in arid eastern central Asia during MIS 3 (51600-25300 cal a BP) from Wulungu Lake, north-western China. *Journal of Quaternary Science* 31, 577-586.

Zhao, Y., Yu, Z., Chen, F., Ito, E., Zhao, C., 2007. Holocene vegetation and climate history at Hurleg Lake in the Qaidam Basin, northwest China. *Review of Palaeobotany and Palynology* 145, 275-288.

Zhong, W., Xue, J., Zheng, Y., Ouyang, J., Ma, Q., Cai, Y., Tang, X., 2010. Climatic changes since the last deglaciation inferred from a lacustrine sedimentary sequence in the eastern Nanling Mountains, south China. *Journal of Quaternary Science* 25, 975-984.

Zhou, A., Chen, F., Wang, Z., Yang, M., Qiang, M., Zhang, J., 2009. Temporal change of radiocarbon reservoir effect in Sugan Lake, Northwest China during the late Holocene. *Radiocarbon* 51, 529-535.

Zhou, A.F., He, Y.X., Wu, D., Zhang, X.N., Zhang, C., Liu, Z.H., Yu, J.Q., 2015. Changes in the Radiocarbon Reservoir Age in Lake Xingyun, Southwestern China during the Holocene. *PLoS One* 10, 12.

Zhou, W., Cheng, P., Jull, A.J.T., Lu, X., An, Z., Wang, H., Zhu, Y., Wu, Z., 2014. 14C Chronostratigraphy for Qinghai Lake in China. *Radiocarbon* 56, 143-155.

Zhou, W., Yu, X., Jull, A.J.T., Burr, G., Xiao, J.Y., Lu, X., Xian, F., 2004. High-resolution evidence from southern China of an early Holocene optimum and a mid-Holocene dry event during the past 18,000 years. *Quaternary Research* 62, 39-48.

Zhou, X., Sun, L., Zhan, T., Huang, W., Zhou, X., Hao, Q., Wang, Y., He, X., Zhao, C., Zhang, J., Qiao, Y., Ge, J., Yan, P., Yan, Q., Shao, D., Chu, Z., Yang, W., P.Smol, J., 2016. Time-transgressive onset of the Holocene Optimum in the East Asian monsoon region. *Earth Planetary Science Letters* 456, 39-46.

Zhu, S., Zhu, L., Wang, J., Ju, J., Ma, Q., Chen, H., Xu, T., Kai, J., 2019. Environmental changes reflected by core sediments since late glacial in Mapam Yum Co, Southwest Tibet of China. *Quaternary Sciences* 39, 602-614.