

Supplementary Information

Methods

Lake and watershed delineation

Although several global datasets of basin boundaries exist (Global Runoff Data Centre 2007; Lehner et al. 2008; Revenga et al. 1998; Verdin 2011), a GIS routine procedure, based on global elevation and hydrologic dataset, was used to generate all the ancient lakes drainage basins, some of which are not included within those datasets. Lake basins of 22 lakes were automatically generated from the flow accumulation data set from the Hydroshed data packages (Lehner et al. 2008, <http://hydrosheds.cr.usgs.gov/>) at 90 m spatial resolution. The Hydroshed dataset provides seamless near-global coverage up to 60°N but excludes high latitude lakes. Therefore watersheds for El'gygytgyn and Pingualuit Lakes were derived from the ASTER GDEM v2 digital terrain model (Tachikawa et al. 2011) that covers the entire land surface of the Earth at 30 meters spatial resolution. The Aral, Eyre, Van, Maracaibo and Caspian lakes have been already delineated and included within the Hydroshed basin layer (spatial resolution of 300m). Catchment boundaries of all 29 lakes were checked with reference to the available literature. Net watershed area was calculated by subtracting the lake area from the total watershed. Watershed area (WA): lake area (LA) ratios were calculated from these metrics. Watershed boundaries are available in Supplemental Shapefile 1.

Watershed and airshed characteristics

Global datasets for gridded estimates of atmospheric deposition of total inorganic nitrogen (N), NH_x (NH₃ and NH₄⁺), and NO_y (all oxidized forms of nitrogen other than N₂O), for the years 1860 and 1993 and projections for the year 2050, are available from Dentener (2006) and Galloway et al. (2004). Due to the coarse resolution of 5 degrees longitude by 3.75 degrees latitude, it was assumed that the pixel in the center of the lake represented mean deposition within the lake airshed. Where lakes covered more than one pixel, we summed the fractions of each pixel falling within the lake.

Human populations within each watershed were estimated using CIESIN-CIAT gridded dataset (2005) available for the years 1990, 1995, and 2000, and projected to 2005, 2010, and 2015 (the Gridded Population of the World (GPW), v3. was released in 2004). The population density was calculated by dividing the total by net watershed area. To estimate the amount of nitrogen and phosphorus annually excreted and egested by humans in the entire lake catchment we multiplied total human numbers by standard corrections (humans release 12g N and 1.5 g P per person per day) and by the number of days in one year. Rates of change in human density were assessed by calculating the slope of a regression analysis of humans per year and dividing by the watershed area.

Land cover classification within each watershed was obtained from CCI Land Cover Project (2014, <https://www.esa-landcover-cci.org/>) which released a global land cover database at 300m spatial resolution for three epochs centered on the year 2010 (2008-2012), 2005 (2003-2007) and 2000 (1998-2002). The CCI-LC nomenclature and legend are based on the UN Land Cover Classification System (LCCS) (Di Gregorio, 2005). For further LC change analysis and assessment, the 22 classes were further grouped into “crops” (classes 10, 20, 30), “forest” (12,

40, 50, 60, 61, 62, 70, 71, 72, 80, 81, 82, 90), “urban” (190) and “other” (11, 110, 120, 121, 122, 130, 140, 150, 152, 153, 160, 170, 180, 200, 201, 202, 220) (Table SI3).

References

- Center for International Earth Science Information Network [CIESIN] Columbia University, & Centro Internacional de Agricultura Tropical [CIAT] (2005). Gridded Population of the World, Version 3 (GPWv3): Population Density Grid, Future Estimates. In. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC)
- Dentener, F.J. 2006. Global Maps of Atmospheric Nitrogen Deposition, 1860, 1993, and 2050. In. Oak Ridge, Tennessee, U.S.A: Data set. Available on-line [<http://daac.ornl.gov/>] from Oak Ridge National Laboratory Distributed Active Archive Center
- Di Gregorio, A. 2005. Land Cover Classification System Classification concepts and user manual Software version (2). Food and Agriculture Organization of the United Nations, Rome.
- [ESA CCI] European Space Agency Climate Change Initiative. 2014. Land Cover (LC) project 2014 (ESA CCI-LC). UCL-Geomatics, Louvain, Belgium ESA CCI-LC consortium
- Galloway, J. N., F. J. Dentener, D. G. Capone, and others. 2004. Nitrogen Cycles: Past, Present, and Future. *Biogeochemistry* **70**: 153–226. doi:10.1007/s10533-004-0370-0
- Global Runoff Data Centre. 2007. Major River Basins of the World. In. Koblenz, Germany: Federal Institute of Hydrology (BfG): Global Runoff Data Centre
- Lehner, B., K. Verdin, and A. Jarvis. 2008. New Global Hydrography Derived From Spaceborne Elevation Data. *Eos Trans. AGU* **89**: 93–94. doi:10.1029/2008EO100001
- Revenga, C., S. Murray, J. Abramovitz, and A. Hammond. 1998. Watersheds of the world: ecological value and vulnerability, World Resources Institute.
- Tachikawa, T., M. Hato, M. Kaku, and A. Iwasaki. 2011. Characteristics of ASTER GDEM version 2. *Geoscience and Remote Sensing Symposium (IGARSS), 2011 IEEE International*. Proceedings of the Geoscience and Remote Sensing Symposium (IGARSS), 2011 IEEE International. 3657–3660.
- Verdin, K.L. 2011. ISLSCP II HYDRO1k Elevation-derived Products. In F.G. Hall, G. Collatz, B. Meeson, S. Los, E. Brown de Colstoun, and D. Landis (Ed.), ISLSCP Initiative II Collection. Oak Ridge, Tennessee, U.S.A.: Data set. Available on-line [<http://daac.ornl.gov/>] from Oak Ridge National Laboratory Distributed Active Archive Center

Table SII: Global gridded estimates of atmospheric deposition of total inorganic nitrogen (mg N km² yr⁻¹) to the ancient lakes in our set. Estimates for multiple years are shown, including: 1993, back-casted estimates for the year 1860, projections for the year 2050, and differences between these years. Data are from Dentener 2006.

| Code | N1860 | N1993 | N2050 | Change 1860-1993 | Projected change 1993-2050 |
|-------------|--------------|--------------|--------------|-----------------------------|---------------------------------------|
| ARAL | 22.6 | 129.0 | 176.9 | 106.3 | 47.9 |
| BAIK | 48.3 | 125.6 | 167.9 | 77.3 | 42.4 |
| BIWA | 81.4 | 894.8 | 1327.3 | 813.4 | 432.5 |
| BOSU | 120.8 | 726.2 | 1343.9 | 605.4 | 617.8 |
| CASP | 61.0 | 381.0 | 634.8 | 320.0 | 253.8 |
| ELGY | 14.1 | 22.5 | 32.2 | 8.4 | 9.7 |
| EYRE | 12.3 | 39.2 | 53.0 | 26.9 | 13.8 |
| HOVS | 57.1 | 162.7 | 224.7 | 105.6 | 62.0 |
| INLE | 293.3 | 784.0 | 1815.6 | 490.7 | 1031.6 |
| ISSY | 47.4 | 246.4 | 340.6 | 199.1 | 94.2 |
| KINN | 31.1 | 496.9 | 1837.8 | 465.8 | 1340.9 |
| LANA | 50.6 | 301.9 | 606.4 | 251.3 | 304.6 |
| MALA | 98.4 | 602.8 | 986.6 | 504.4 | 383.8 |
| MANI | 45.0 | 149.5 | 159.9 | 104.5 | 10.4 |
| MARA | 48 | 523.6 | 1733.25 | 475.6 | 1209.7 |
| MATA | 59.4 | 282.1 | 470.8 | 222.7 | 188.7 |
| OHRI | 116.6 | 613.6 | 835.9 | 496.9 | 222.3 |
| PING | 9.8 | 28.6 | 35.2 | 18.8 | 6.6 |
| POSO | 59.4 | 282.1 | 470.8 | 222.7 | 188.7 |
| POTR | 18.7 | 73.6 | 217.0 | 54.9 | 143.4 |
| PRES | 116.6 | 613.6 | 835.9 | 496.9 | 222.3 |
| TAHO | 79.5 | 231.2 | 282.4 | 151.8 | 51.2 |
| TANG | 186.3 | 628.8 | 980.4 | 442.4 | 351.7 |
| TITI | 91.6 | 338.5 | 845.9 | 246.9 | 507.4 |
| TULE | 60.9 | 284.4 | 342.8 | 223.5 | 58.4 |
| VALE | 28.4 | 465.9 | 1743.4 | 437.5 | 1277.5 |
| VANL | 76.5 | 535.8 | 1458.5 | 459.3 | 922.7 |
| VICT | 104.9 | 739.0 | 1647.3 | 634.0 | 908.3 |
| ZAYS | 29.4 | 135.9 | 218.5 | 106.5 | 82.6 |

Table SI2: Changes in land cover classes as a percent of the total catchment area 2000-2010 ranked in order of increasing change.

| Crop cover | | Forest cover | |
|-------------------|-----------------|---------------------|-----------------|
| <i>Lake</i> | <i>% change</i> | <i>Lake</i> | <i>% change</i> |
| LANA | -0.07 | MATA | -2.64 |
| VALE | -0.04 | BOSU | -1.91 |
| ELGY | 0.00 | MANI | -0.93 |
| EYRE | 0.00 | POSO | -0.51 |
| KINN | 0.00 | TANG | -0.44 |
| MANI | 0.00 | ISSY | -0.24 |
| OHRI | 0.00 | INLE | -0.18 |
| PING | 0.00 | BAIK | -0.17 |
| POTR | 0.00 | VICT | -0.16 |
| PRES | 0.00 | MALA | -0.13 |
| TAHO | 0.00 | MARA | -0.08 |
| TITI | 0.00 | HOVS | -0.05 |
| TULE | 0.00 | CASP | -0.04 |
| VANL | 0.00 | ZAYS | -0.03 |
| ARAL | 0.00 | EYRE | -0.01 |
| BIWA | 0.00 | ARAL | -0.01 |
| ZAYS | 0.02 | BIWA | 0.00 |
| CASP | 0.03 | TITI | 0.00 |
| HOVS | 0.04 | ELGY | 0.00 |
| ISSY | 0.07 | KINN | 0.00 |
| BAIK | 0.07 | OHRI | 0.00 |
| MARA | 0.08 | PING | 0.00 |
| MALA | 0.12 | POTR | 0.00 |
| VICT | 0.16 | PRES | 0.00 |
| INLE | 0.18 | TAHO | 0.00 |
| TANG | 0.39 | VANL | 0.00 |
| POSO | 0.51 | VALE | 0.05 |
| MATA | 1.86 | LANA | 0.07 |
| BOSU | 1.91 | TULE | 0.20 |

Table SI3: CCI land cover classifications used.

| Value | Original Land Cover Class | Aggregated Class |
|--------------|---|-------------------------|
| 0 | No Data | |
| 10 | Cropland, rainfed | Crops |
| 11 | Herbaceous cover | Other |
| 12 | Tree or shrub cover | Forest |
| 20 | Cropland, irrigated or post-flooding | Crops |
| 30 | Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous) | Crops |
| 40 | Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) | Forest |
| 50 | Tree cover, broadleaved, evergreen, closed to open (>15%) | Forest |
| 60 | Tree cover, broadleaved, deciduous, closed to open (>15%) | Forest |
| 61 | Tree cover, broadleaved, deciduous, closed (>40%) | Forest |
| 62 | Tree cover, broadleaved, deciduous, open (15-40%) | Forest |
| 70 | Tree cover, needleleaved, evergreen, closed to open (>15%) | Forest |
| 71 | Tree cover, needleleaved, evergreen, closed (>40%) | Forest |
| 72 | Tree cover, needleleaved, evergreen, open (15-40%) | Forest |
| 80 | Tree cover, needleleaved, deciduous, closed to open (>15%) | Forest |
| 81 | Tree cover, needleleaved, deciduous, closed (>40%) | Forest |
| 82 | Tree cover, needleleaved, deciduous, open (15-40%) | Forest |
| 90 | Tree cover, mixed leaf type (broadleaved and needleleaved) | Forest |
| 100 | Mosaic tree and shrub (>50%) / herbaceous cover (<50%) | Forest |
| 110 | Mosaic herbaceous cover (>50%) / tree and shrub (<50%) | Other |
| 120 | Shrubland | Other |
| 121 | Evergreen shrubland | Other |
| 122 | Deciduous shrubland | Other |
| 130 | Grassland | Other |
| 140 | Lichens and mosses | Other |
| 150 | Sparse vegetation (tree, shrub, herbaceous cover) (<15%) | Other |
| 152 | Sparse shrub (<15%) | Other |
| 153 | Sparse herbaceous cover (<15%) | Other |
| 160 | Tree cover, flooded, fresh or brakish water | Other |
| 170 | Tree cover, flooded, saline water | Other |
| 180 | Shrub or herbaceous cover, flooded, fresh/saline/brakish water | Other |
| 190 | Urban areas | Urban |
| 200 | Bare areas | Other |
| 201 | Consolidated bare areas | Other |
| 202 | Unconsolidated bare areas | Other |
| 210 | Water bodies | |
| 220 | Permanent snow and ice | Other |

Table SI4. Examples of peer-reviewed English-language literature reporting recent ecological change in ancient lakes. The summary is non-exhaustive, limited to a maximum of three studies for each type of change and each lake.

| Lake | Climate Change | Eutrophication | Metals & Emerging Contaminants | Lake Level |
|--------------------------------|--|---|---|---|
| Caspian Sea | (Ginzburg et al. 2004; Elguindi and Giorgi 2006, 2007) | (Pourjomeh and Shokri 2016) | (Watanabe et al. 1999; Agah et al. 2007; Hosseini et al. 2015) | (Hofmann et al. 2008; Ozyavas and Khan 2012) |
| Lake El'gygytgyn | --- | --- | --- | --- |
| Lake Hovsgol (Khuvsgul) | (Nandintsetseg et al. 2007) | --- | (Free et al. 2014) | --- |
| Lake Kinneret (Sea of Galilee) | (Rimmer et al. 2011a; b) | (Gophen et al. 1999; Hambright et al. 2001; Orihel et al. 2013) | (Erel et al. 2001; Blanchfield et al. 2012) | |
| Lake Van | (Kadioglu et al. 1997) | --- | (Yarsan et al. 2000; Oguz and Yeltekin 2014; Erenturk et al. 2014) | (Kilincaslan 2000; Deniz and Yildiz 2007; Kaden et al. 2010) |
| Aral Sea | (Small et al. 2001; Khan et al. 2004; Kouraev et al. 2004) | --- | (Friedrich 2009) | (Cretaux et al. 2005; Boroffka et al. 2006; Austin et al. 2007) |
| Lake Baikal | (Moore et al. 2009; Shimaraev et al. 2009; Izmet'seva et al. 2011) | --- | (Kucklick et al. 1993; Tsydenova et al. 2004; Ciesielski et al. 2010) | (Colman 1998; Bychkov and Nikitin 2015; Dabaeva et al. 2016) |
| Lake Biwa | (Tsugeki et al. 2009, 2010; Yoshimizu et al. 2010) | (Tsugeki et al. 2003; Hsieh et al. 2010, 2011) | (Mito et al. 2004; Sudo et al. 2004; Tsuda et al. 2009) | --- |

| Lake | Climate Change | Eutrophication | Metals & Emerging Contaminants | Lake Level |
|-----------------------|--|--|---|---|
| Lake Issyk-Kul | (Salamat et al. 2015) | --- | --- | (Guo et al. 2011; Salamat et al. 2015) |
| Lake Valencia | --- | (Jaffé et al. 1993) | (Mogollon et al. 1996; Lopez et al. 2000; Gonzalez et al. 2013) | --- |
| Lake Lanao | (Jose and Cruz 1999) | --- | --- | --- |
| Inle Lake | --- | (Akaishi et al. 2006) | --- | (Sidle et al. 2007) |
| Lake Pingualuit | --- | --- | (Gantner et al. 2012) | --- |
| Lake Bosumtwi | (Turner et al. 1996; Shanahan et al. 2007) | --- | (Adu-Kumi et al. 2010; Poste et al. 2012) | --- |
| Lake Eyre | (Williams 2002) | --- | --- | --- |
| Manicouagan Reservoir | --- | --- | --- | --- |
| Lake Maracaibo | --- | (Morales et al. 2001a; b; Rivas et al. 2009) | (Mesa et al. 2007; Avila et al. 2010) | --- |
| Lake Matano | --- | --- | --- | --- |
| Lake Poso | --- | --- | --- | --- |
| Lake Potrok-Aike | --- | --- | --- | (Haberzettl et al. 2005; Ohlendorf et al. 2013) |
| Lake Zaysan | --- | --- | --- | (Bai et al. 2012) |
| Lake Tule | --- | --- | (Elbert and Anderson 1998) | --- |

| Lake | Climate Change | Eutrophication | Metals & Emerging Contaminants | Lake Level |
|-----------------------------|--|---|---|---|
| Lake Victoria | (Lehman 1998; Marshall et al. 2013; Ogutu-Ohwayo et al. 2016) | (Hecky 1992; Kolding et al. 2008; van Rijssel et al. 2016) | (Campbell et al. 2003; Henry and Kishimba 2006; Oyoo-Okoth et al. 2010) | (Sutcliffe and Petersen 2007; Awange et al. 2008; Minakawa et al. 2008) |
| Lake Tanganyika | (Tierney et al. 2010; Kraemer et al. 2015; Cohen et al. 2016) | (Langenberg et al. 2003; Brion et al. 2006; Kelly et al. 2017) | (Manirakiza et al. 2002; Campbell et al. 2008; Conaway et al. 2012) | (Sturmbauer et al. 2001; Alin and Cohen 2003; Hassan and Jin 2014) |
| Lake Malawi (Nyasa, Niassa) | (Vollmer et al. 2005; Castañeda et al. 2011; Van Bocxlaer et al. 2012) | (Hecky et al. 2003; Gondwe et al. 2011; Otu et al. 2011) | (Karlsson et al. 2000; Kidd et al. 2003; Campbell et al. 2008) | (Ponchaut and Cazenave 1998; Jury and Gwazantini 2002; Hassan and Jin 2014) |
| Lake Titicaca | --- | --- | (Gammons et al. 2006; Choque et al. 2013; Monroy et al. 2014) | --- |
| Lake Ohrid (Ohridsko) | (Matzinger et al. 2006; Zhang et al. 2016) | (Matzinger et al. 2007; Schneider et al. 2014; Trajanovska et al. 2014) | (Veljanoska-Sarafiloska et al. 2011; Malaj et al. 2012; Neziri et al. 2016) | (Popovska and Bonacci 2007; Lindhorst et al. 2010; Smiljkov et al. 2013) |
| Lake Prespa | (Naumoski and Mitreski 2009) | (Mitreski and Naumoski 2007) | (Neziri et al. 2016) | (Löffler et al. 1998; Popovska and Bonacci 2007; Radevski and Gorin 2014) |
| Lake Tahoe | (Coats et al. 2006; Winder et al. 2009; Sahoo et al. 2016) | (Goldman 1988; Jassby et al. 1995; Caires et al. 2013) | (Datta et al. 1999; Drevnick et al. 2010) | (Sahoo et al. 2013) |

Table SI4 (cont.). Examples of peer-reviewed English-language literature reporting recent ecological change in ancient lakes. The summary is non-exhaustive, limited to a maximum of three studies for each type of change and each lake.

| Lake | Overfishing | Non-native species | Miscellaneous |
|--------------------------------|--|--|--|
| Caspian Sea | (Daskalov and Mamedov 2007; Ruban and Khodorevskaya 2011; Mitrofanov and Mamilov 2015) | (Finenko et al. 2006; Roohi et al. 2008; Bagheri et al. 2014) | (Leonov and Chicherina 2009) |
| Lake El'gygytgyn | --- | --- | (Nolan and Brigham-Grette 2007) |
| Lake Hovsgol (Khuvsgul) | --- | --- | (Sapozhnikov and Metreveli 2000) |
| Lake Kinneret (Sea of Galilee) | (Walline et al. 1992; Bentuvia et al. 1992; Gophen et al. 1999) | (Roll et al. 2007; Alster et al. 2010; Heller et al. 2014) | (Fazli et al. 2007) |
| Lake Van | (Sari 2008) | --- | (Deniz and Yildiz 2007) |
| Aral Sea | (Mitrofanov and Mamilov 2015) | --- | (Williams and Aladin 1991) |
| Lake Baikal | (Matveyev and Samusenok 2015) | Kozhova and Iziboldina 1993; Hall and Mills 2000 | (Miyasaka et al. 2006; Jakob et al. 2016; Timoshkin et al. 2016) |
| Lake Biwa | (Nishimori et al. 1992) | (Shibata et al. 2011; Kuwahara et al. 2012; Tsunoda et al. 2015) | --- |
| Lake Issyk-Kul | (Alamanov and Mikkola 2011; Mikkola 2012) | (Alamanov and Mikkola 2011; Mikkola 2012) | --- |
| Lake Valencia | --- | --- | --- |
| Lake Lanao | (Ismail et al. 2014) | --- | --- |
| Inle Lake | --- | (Mund et al. 2014) | --- |
| Lake Pingualuit | --- | --- | --- |
| Lake Bosumtwi | --- | --- | --- |

| Lake | Overfishing | Non-native species | Miscellaneous |
|-----------------------------|--|--|----------------------|
| Lake Eyre | --- | --- | --- |
| Manicouagan Reservoir | --- | --- | --- |
| Lake Maracaibo | (Villasmil and Mendoza 2001) | --- | --- |
| Lake Matano | --- | (Herder et al. 2012) | --- |
| Lake Poso | --- | --- | --- |
| Lake Potrok-Aike | --- | --- | --- |
| Lake Zaysan | --- | --- | --- |
| Lake Tule | --- | --- | --- |
| Lake Victoria | (Goudswaard et al. 2002; Njiru et al. 2007; Paterson and Chapman 2009) | (Ogutu-Ohwayo 1990; Goldschmidt et al. 1993; Kitchell et al. 1997) | --- |
| Lake Tanganyika | (Knaap et al. 2014; McLean et al. 2014; Cohen et al. 2016) | (Van Bocxlaer and Albrecht 2015) | --- |
| Lake Malawi (Nyasa, Niassa) | (Lowe-McConnell 1993; Weyl et al. 2010; Hara and Njaya 2016) | (Genner et al. 2008; Zidana et al. 2009; Van Bocxlaer and Albrecht 2015) | --- |
| Lake Titicaca | (Capriles et al. 2014) | (Villwock 1993; Albrecht et al. 2009) | --- |
| Lake Ohrid (Ohridsko) | (Kostoski et al. 2010) | (Cakić et al. 2002; Kostoski et al. 2010; Albrecht et al. 2014) | --- |
| Lake Prespa | (Crivelli et al. 1997) | (Rosecchi et al. 1993; Crivelli et al. 1997; Albrecht et al. 2012) | --- |
| Lake Tahoe | --- | (Chilton 2012; Wittmann et al. 2012; Hoyer et al. 2015) | --- |

References for Table SI4

- Adu-Kumi, S., M. Kawano, Y. Shiki, P. O. Yeboah, D. Carboo, J. Pwamang, M. Morita, and N. Suzuki. 2010. Organochlorine pesticides (OCPs), dioxin-like polychlorinated biphenyls (dl-PCBs), polychlorinated dibenzo-p-dioxins and polychlorinated dibenzo furans (PCDD/Fs) in edible fish from Lake Volta, Lake Bosumtwi and Weija Lake in Ghana. *Chemosphere* 81: 675–684. doi:10.1016/j.chemosphere.2010.08.018
- Albrecht, C., K. Föller, C. Clewing, T. Hauße, and T. Wilke. 2014. Invaders versus endemics: alien gastropod species in ancient Lake Ohrid. *Hydrobiologia* 739: 163–174. doi: 10.1007/s10750-013-1724-1
- Albrecht, C., T. Hauße, K. Schreiber, and T. Wilke. 2012. Mollusc biodiversity in a European ancient lake system: lakes Prespa and Mikri Prespa in the Balkans. *Hydrobiologia* 682: 47–59. doi: 10.1007/s10750-011-0830-1
- Agah, H., M. Leermakers, M. Elskens, S. M. R. Fatemi, and W. Baeyens. 2007. Total mercury and methyl mercury concentrations in fish from the Persian Gulf and the Caspian Sea. *Water, Air, Soil Pollut.* 181: 95–105. doi:10.1007/s11270-006-9281-0
- Akaishi, F., M. Satake, M. Otaki, and N. Tominaga. 2006. Surface water quality and information about the environment surrounding Inle Lake in Myanmar. *Limnology* 7: 57–62. doi:10.1007/s10201-006-0165-1
- Alamanov, A., and H. Mikkola. 2011. Is biodiversity friendly fisheries management possible on Issyk-Kul Lake in the Kyrgyz Republic? *Ambio* 40: 479–495. doi:10.1007/s13280-011-0140-x
- Albrecht, C., O. Kroll, E. M. Terrazas, and T. Wilke. 2009. Invasion of ancient Lake Titicaca by the globally invasive *Physa acuta* (Gastropoda: Pulmonata: Hygrophila). *Biol. Invasions* 11: 1821–1826. doi:10.1007/s10530-008-9360-9
- Alin, S. R., and A. S. Cohen. 2003. Lake-level history of Lake Tanganyika, East Africa, for the past 2500 years based on ostracode-inferred water-depth reconstruction. *Palaeogeogr. Palaeoclimatol. Palaeoecol.* 199: 31–49. doi:10.1016/S0031-0182(03)00484-X
- Alster, A., R. N. Kaplan-Levy, A. Sukenik, and T. Zohary. 2010. Morphology and phylogeny of a non-toxic invasive *Cylindrospermopsis raciborskii* from a Mediterranean Lake. *Hydrobiologia* 639: 115–128. doi:10.1007/s10750-009-0044-y
- Austin, P., A. Mackay, O. Palagushkina, and M. Leng. 2007. A high-resolution diatom-inferred palaeoconductivity and lake level record of the Aral Sea for the last 1600 yr. *Quat. Res.* 67: 383–393. doi:10.1016/j.yqres.2007.01.009
- Avila, H., E. Gutierrez, H. Ledo, M. Araujo, and M. Sanquiz. 2010. Heavy metals distribution in superficial sediments of Maracaibo Lake (Venezuela). *Rev. Tec. Fac. Ing. Univ. Zulia* 33: 122–129.
- Awange, J. L., M. A. Sharifi, G. Ogonda, J. Wickert, E. W. Grafarend, and M. A. Omulo. 2008. The Falling Lake Victoria Water Level: GRACE, TRIMM and CHAMP Satellite Analysis of the Lake Basin. *Water Resour. Manag.* 22: 775–796. doi:10.1007/s11269-007-9191-y
- Bagheri, S., Niermann, U., Mansor, M., and F.S. Yeok. 2014. Biodiversity, distribution and abundance of zooplankton in the Iranian waters of the Caspian Sea off Anzali during 1996–2010. *Journal of the Marine Biological Association of the United Kingdom* 94: 129–140. doi: 10.1017/S0025315413001288
- Bai, J., X. Chen, L. Yang, and H. Fang. 2012. Monitoring variations of inland lakes in the arid region of Central Asia. *Front. Earth Sci.* 6: 147–156. doi:10.1007/s11707-012-0316-0

- Bentuvia, A., E. Davidoff, J. Shapiro, and D. Shefler. 1992. Biology and management of Lake Kinneret fisheries. *Isr. J. Aquac.-Bamidgeh* 44: 48–65.
- Blanchfield, P. J., J. Shapiro, A. Sukenik, D. M. Orihel, and E. Shefer. 2012. Low Mercury Levels in Lake Kinneret Fish. *Isr. J. Aquac.-Bamidgeh* 64: 783.
- Boroffka, N., H. Oberhänsli, P. Sorrel, and others. 2006. Archaeology and climate: Settlement and lake-level changes at the Aral Sea. *Geoarchaeology* 21: 721–734. doi:10.1002/gea.20135
- Brion, N., E. Nzeyimana, L. Goeyens, D. Nahimana, C. Tungaraza, and W. Baeyens. 2006. Inorganic nitrogen uptake and river inputs in northern Lake Tanganyika. *J. Gt. Lakes Res.* 32: 553–564. doi:10.3394/0380-1330(2006)32[553:INUARI]2.0.CO;2
- Bychkov, I. V., and V. M. Nikitin. 2015. Water-Level Regulation of Lake Baikal: Problems and Possible Solutions. *Geogr. Nat. Resour.* 36: 215–224. doi:10.1134/S1875372815030014
- Caires, A. M., S. Chandra, B. L. Hayford, and M. E. Wittmann. 2013. Four decades of change: dramatic loss of zoobenthos in an oligotrophic lake exhibiting gradual eutrophication. *Freshw. Sci.* 32: 692–705. doi:10.1899/12-064.1
- Cakić, P. D., S. Stojanovski, Z. Kulišić, N. Hristovski, and M.B. Lenhardt. 2002. Occurrence of *Anguillicola crassus*, Nematoda: Dracunculoidea, in eels of lake Ohrid, Macedonia. *Acta Vet.* 52: 163-168. doi: 10.2298/AVB0203163C
- Campbell, L., D. G. Dixon, and R. E. Hecky. 2003. A review of mercury in Lake Victoria, East Africa: Implications for human and ecosystem health. *J. Toxicol. Environ. Health Part B* 6: 325–356. doi:10.1080/10937400306474
- Campbell, L., P. Verburg, D. G. Dixon, and R. E. Hecky. 2008. Mercury biomagnification in the food web of Lake Tanganyika (Tanzania, East Africa). *Sci. Total Environ.* 402: 184–191. doi:10.1016/j.scitotenv.2008.04.017
- Capriles, J. M., K. M. Moore, A. I. Domic, and C. A. Hastorf. 2014. Fishing and environmental change during the emergence of social complexity in the Lake Titicaca Basin. *J. Anthropol. Archaeol.* 34: 66-77. Doi:10.1016/j.jaa.2014.02.001
- Capriles, J. M., K. M. Moore, A. I. Domic, and C. A. Hastorf. 2014. Fishing and environmental change during the emergence of social complexity in the Lake Titicaca Basin. *J. Anthropol. Archaeol.* 34: 66–77. doi:10.1016/j.jaa.2014.02.001
- Center for International Earth Science Information Network [CIESIN] Columbia University, & Centro Internacional de Agricultura Tropical [CIAT] (2005). Gridded Population of the World, Version 3 (GPWv3): Population Density Grid, Future Estimates. In. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC)
- Center for International Earth Science Information Network [CIESIN] Columbia University, & Centro Internacional de Agricultura Tropical [CIAT] (2005). Gridded Population of the World, Version 3 (GPWv3): Population Density Grid, Future Estimates. In. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC)
- Chilton, S. 2012. An overview of the Lake Tahoe aquatic invasive species prevention and control programs. *J. Shellfish Res.* 31: 269–269.
- Choque, L. F. C., O. E. R. Ramos, S. N. V. Castro, R. R. C. Aspiazu, R. G. C. Mamani, S. G. F. Alcazar, O. Sracek, and P. Bhattacharya. 2013. Fractionation of heavy metals and assessment of contamination of the sediments of Lake Titicaca. *Environ. Monit. Assess.* 185: 9979–9994. doi:10.1007/s10661-013-3306-0

- Ciesielski, T., M. V. Pastukhov, P. Szefer, and B. M. Jenssen. 2010. Bioaccumulation of mercury in the pelagic food chain of the Lake Baikal. *Chemosphere* 78: 1378–1384. doi:10.1016/j.chemosphere.2009.12.070
- Coats, R., J. Perez-Losada, G. Schladow, R. Richards, and C. Goldman. 2006. The warming of Lake Tahoe. *Clim. Change* 76: 121–148. doi:10.1007/s10584-005-9006-1
- Cohen, A. S., E. L. Gergurich, B. M. Kraemer, M. M. McGlue, P. B. McIntyre, J. M. Russell, J. D. Simmons, and P. W. Swarzenski. 2016. Climate warming reduces fish production and benthic habitat in Lake Tanganyika, one of the most biodiverse freshwater ecosystems. *Proc. Natl. Acad. Sci.* 113: 9563–9568. doi:10.1073/pnas.1603237113
- Colman, S. M. 1998. Water-level changes in Lake Baikal, Siberia: Tectonism versus climate. *Geology* 26: 531–534. doi:10.1130/0091-7613(1998)026<0531:WLCILB>2.3.CO;2
- Conaway, C. H., P. W. Swarzenski, and A. S. Cohen. 2012. Recent paleorecords document rising mercury contamination in Lake Tanganyika. *Appl. Geochem.* 27: 352–359. doi:10.1016/j.apgeochem.2011.11.005
- Cretaux, J. F., A. Kouraev, M. Berge-Nguyen, A. Cazenave, and F. Papa. 2005. Satellite altimetry for monitoring lake level changes, p. 141–146. In H. Vogtman and N. Dobretsov [eds.], *Transboundary Water Resources: Strategies for Regional Security and Ecological Stability*. Springer.
- Crivelli, A. J., G. Catsadorakis, M. Malakou, and E. Rosecchi. 1997. Fish and fisheries of the Prespa lakes. *Hydrobiologia* 351: 107–125. doi:10.1023/A:1003064509018
- Dabaeva, D. B., B. Z. Tsydypov, A. A. Ayurzhanaev, S. G. Andreev, and Y. Z. Garmaev. 2016. Peculiarities of Lake Baikal water level regime, p. UNSP 012014. In E. Gordov and V. Lykosov [eds.], *International Conference and Early Career Scientists School on Environmental Observations, Modelling and Information Systems (enviromis-2016)*.
- Daskalov, G. M., and E. V. Mamedov. 2007. Integrated fisheries assessment and possible causes for the collapse of anchovy kilka in the Caspian Sea. *Ices J. Mar. Sci.* 64: 503–511. doi:10.1093/icesjms/fsl047
- Datta, S., K. Ohyama, D. Y. Dunlap, and F. Matsumura. 1999. Evidence for organochlorine contamination in tissues of salmonids in Lake Tahoe. *Ecotoxicol. Environ. Saf.* 42: 94–101. doi:10.1006/eesa.1998.1739
- Deniz, O., and M. Z. Yildiz. 2007. The ecological consequences of level changes in Lake Van. *Water Resour.* 34: 707–711. doi:10.1134/S0097807807060127
- Dentener, F.J. 2006. Global Maps of Atmospheric Nitrogen Deposition, 1860, 1993, and 2050. In. Oak Ridge, Tennessee, U.S.A: Data set. Available on-line [<http://daac.ornl.gov/>] from Oak Ridge National Laboratory Distributed Active Archive Center
- Di Gregorio, A. 2005. Land Cover Classification System Classification concepts and user manual Software version (2). Food and Agriculture Organization of the United Nations, Rome.
- Drevnick, P. E., A. L. C. Shinneman, C. H. Lamborg, D. R. Engstrom, M. H. Bothner, and J. T. Oris. 2010. Mercury flux to sediments of Lake Tahoe, California–Nevada. *Water. Air. Soil Pollut.* 210: 399–407. doi:10.1007/s11270-009-0262-y
- Elbert, R. A., and D. W. Anderson. 1998. Mercury levels, reproduction, and hematology in western grebes from three California lakes, USA. *Environ. Toxicol. Chem.* 17: 210–213. doi:10.1897/1551-5028(1998)017<0210:MLRAHI>2.3.CO;2

- Elguindi, N., and F. Giorgi. 2006. Simulating multi-decadal variability of Caspian Sea level changes using regional climate model outputs. *Clim. Dyn.* 26: 167–181. doi:10.1007/s00382-005-0077-5
- Elguindi, N., and F. Giorgi. 2007. Simulating future Caspian sea level changes using regional climate model outputs. *Clim. Dyn.* 28: 365–379. doi:10.1007/s00382-006-0185-x
- Erel, Y., Y. Dubowski, L. Halicz, J. Erez, and A. Kaufman. 2001. Lead concentrations and isotopic ratios in the sediments of the Sea of Galilee. *Environ. Sci. Technol.* 35: 292–299. doi:10.1021/es0013172
- Erenturk, S., S. Yusan, D. A. Turkozu, Z. Camtakan, M. K. Olgen, M. A. A. Aslani, S. Aytas, and M. A. Isik. 2014. Spatial distribution and risk assessment of radioactivity and heavy metal levels of sediment, surface water and fish samples from Lake Van, Turkey. *J. Radioanal. Nucl. Chem.* 300: 919–931. doi:10.1007/s10967-014-3042-0
- [ESA CCI] European Space Agency Climate Change Initiative. 2014. Land Cover (LC) project 2014 (ESA CCI-LC). UCL-Geomatics, Louvain, Belgium ESA CCI-LC consortium
- Fazli, H., C.-I. Zhang, D. E. Hay, C.-W. Lee, A.-A. Janbaz, and M. S. Borani. 2007. Population ecological parameters and biomass of anchovy *Clupeonella Caspian engrauliformis* in the Sea. *Fish. Sci.* 73: 285–294. doi:10.1111/j.1444-2906.2007.01334.x
- Finenko, G. A., A. E. Kideys, B. E. Anninsky, T. A. Shiganova, A. Roohi, M. R. Tabari, H. Rostami, and S. Bagheri. 2006. Invasive ctenophore *Mnemiopsis leidyi* in the Caspian Sea: feeding, respiration, reproduction and predatory impact on the zooplankton community. *Mar. Ecol. Prog. Ser.* 314: 171–185. doi:10.3354/meps314171
- Free, C. M., O. P. Jensen, S. A. Mason, M. Eriksen, N. J. Williamson, and B. Boldgiv. 2014. High-levels of microplastic pollution in a large, remote, mountain lake. *Mar. Pollut. Bull.* 85: 156–163. doi:10.1016/j.marpolbul.2014.06.001
- Friedrich, J. 2009. Uranium contamination of the Aral Sea. *J. Mar. Syst.* 76: 322–335. doi:10.1016/j.jmarsys.2008.03.020
- Galloway, J. N., F. J. Dentener, D. G. Capone, and others. 2004. Nitrogen cycles: Past, present, and future. *Biogeochemistry* 70: 153–226. doi:10.1007/s10533-004-0370-0
- Gammons, C. H., D. G. Slotton, B. Gerbrandt, and others. 2006. Mercury concentrations of fish, river water, and sediment in the Río Ramis-Lake Titicaca watershed, Peru. *Sci. Total Environ.* 368: 637–648. doi:10.1016/j.scitotenv.2005.09.076
- Gantner, N., J. Veillette, W. K. Michaud, and others. 2012. Physical and biological factors affecting mercury and perfluorinated contaminants in Arctic Char (*Salvelinus alpinus*) of Pingualuit Crater Lake (Nunavik, Canada). *Arctic* 65: 195–206.
- Genner, M. J., E. Michel, and J. A. Todd. 2008. Resistance of an invasive gastropod to an indigenous trematode parasite in Lake Malawi. *Biol. Invasions* 10: 41–49. doi:10.1007/s10530-007-9105-1
- Ginzburg, A. I., A. G. Kostianoi, and N. A. Sheremet. 2004. Seasonal and interannual variability of the surface temperature in the Caspian Sea. *Oceanology* 44: 605–618.
- Global Runoff Data Centre. 2007. Major River Basins of the World. In. Koblenz, Germany: Federal Institute of Hydrology (BfG): Global Runoff Data Centre
- Goldman, C. R. 1988. Primary productivity, nutrients, and transparency during the early onset of eutrophication in ultra-oligotrophic Lake Tahoe, California-Nevada. *Limnol. Oceanogr.* 33: 1321–1333. doi:10.4319/lo.1988.33.6.1321

- Goldschmidt, T., F. Witte, and J. Wanink. 1993. Cascading effects of the introduced Nile Perch on the Detritivorous/Phytoplanktivorous species in the sublittoral areas of Lake Victoria. *Conserv. Biol.* 7: 686–700. doi:10.1046/j.1523-1739.1993.07030686.x
- Gondwe, M. J. S., S. J. Guildford, and R. E. Hecky. 2011. Carbon, nitrogen and phosphorus loadings from tilapia fish cages in Lake Malawi and factors influencing their magnitude. *J. Gt. Lakes Res.* 37: 93–101. doi:10.1016/j.jglr.2010.11.014
- Gonzalez, A., M. G. Palma, K. Ziegler, E. Gonzalez, and M. A. Alvarez. 2013. Contamination and risk assessment of heavy metals in bottom sediments from Lake Valencia, Venezuela, p. 16001. In N. Pirrone [ed.], *Proceedings of the 16th International Conference on Heavy Metals in the Environment*. E D P Sciences.
- Gophen, M., V. H. Smith, A. Nishri, and S. T. Threlkeld. 1999. Nitrogen deficiency, phosphorus sufficiency, and the invasion of Lake Kinneret, Israel, by the N-2-fixing cyanobacterium *Aphanizomenon ovalisporum*. *Aquat. Sci.* 61: 293–306. doi:10.1007/PL00001326
- Goudswaard, P. C., F. Witte, and E. F. B. Katunzi. 2002. The tilapiine fish stock of Lake Victoria before and after the Nile perch upsurge. *J. Fish Biol.* 60: 838–856. doi:10.1111/j.1095-8649.2002.tb02413.x
- Guo, J., J. Sun, X. Chang, S. Guo, and X. Liu. 2011. Correlation Analysis of NINO3.4 SST and Inland Lake Level Variations Monitored with Satellite Altimetry: Case Studies of Lakes Hongze, Khanka, La-ang, Ulungur, Issyk-kul and Baikal. *Terr. Atmospheric Ocean. Sci.* 22: 203–213. doi:10.3319/TAO.2010.09.17.01(TibXS)
- Haberzettl, T., M. Fey, A. Lucke, and others. 2005. Climatically induced lake level changes during the last two millennia as reflected in sediments of Laguna Potrok Aike, southern Patagonia (Santa Cruz, Argentina). *J. Paleolimnol.* 33: 283–302. doi:10.1007/s10933-004-5331-z
- Hall, S. R., and E. L. Mills. 2000. Exotic species in large lakes of the world. *Aquat. Ecosyst. Health.* 3: 105–135. doi: 10.1016/S1463-4988(99)00070-6
- Hambright, K. D., T. Zohary, J. Easton, B. Azoulay, and T. Fishbein. 2001. Effects of zooplankton grazing and nutrients on the bloom-forming, N-2-fixing cyanobacterium *Aphanizomenon* in Lake Kinneret. *J. Plankton Res.* 23: 165–174. doi:10.1093/plankt/23.2.165
- Hara, M., and F. Njaya. 2016. Between a rock and a hard place: The need for and challenges to implementation of Rights Based Fisheries Management in small-scale fisheries of southern Lake Malawi. *Fish. Res.* 174: 10–18. doi:10.1016/j.fishres.2015.08.005
- Hassan, A. A., and S. Jin. 2014. Lake level change and total water discharge in East Africa Rift Valley from satellite-based observations. *Glob. Planet. Change* 117: 79–90. doi:10.1016/j.gloplacha.2014.03.005
- Hecky, R. E. 1992. The eutrophication of Lake Victoria. *SIL Proc.* 1922–2010 25: 39–48. doi:10.1080/03680770.1992.11900057
- Hecky, R. E., H. A. Bootsma, and M. L. Kingdon. 2003. Impact of land use on sediment and nutrient yields to Lake Malawi/Nyasa (Africa). *J. Gt. Lakes Res.* 29: 139–158. doi:10.1016/S0380-1330(03)70544-9
- Heller, J., A. Dolev, T. Zohary, and G. Gal. 2014. Invasion dynamics of the snail *Pseudoplotia scabra* in Lake Kinneret. *Biol. invasions* 16: 7–12. doi: 10.1007/s10530-013-0500-5
- Henry, L., and M. A. Kishimba. 2006. Pesticide residues in Nile tilapia (*Oreochromis niloticus*) and Nile perch (*Lates niloticus*) from Southern Lake Victoria, Tanzania. *Environ. Pollut.* 140: 348–354. doi:10.1016/j.envpol.2005.06.029

- Herder, F., U. K. Schliewen, M. F. Geiger, R. K. Hadiaty, S. M. Gray, J. S. McKinnon, R. P. Walter, and J. Pfaender. 2012. Alien invasion in Wallace's Dreamponds: records of the hybridogenic "flowerhorn" cichlid in Lake Matano, with an annotated checklist of fish species introduced to the Malili Lakes system in Sulawesi. *Aquat. Invasions* 7: 521–535. doi:10.3391/ai.2012.7.4.009
- Hofmann, H., A. Lorke, and F. Peeters. 2008. Temporal scales of water-level fluctuations in lakes and their ecological implications. *Hydrobiologia* 613: 85–96. doi:10.1007/s10750-008-9474-1
- Hosseini, S. M., M. Kariminasab, M. Batebi-Navaei, F. Aflaki, F. Monsefrad, J. M. Regenstein, and R. Vajdi. 2015. Assessment of the essential elements and heavy metals content of the muscle of Kutum (*Rutilus frisii kutum*) from the south Caspian Sea and potential risk assessment. *Iran. J. Fish. Sci.* 14: 660–671.
- Hoyer, A. B., S. G. Schladow, and F. J. Rueda. 2015. Local dispersion of nonmotile invasive bivalve species by wind-driven lake currents. *Limnol. Oceanogr.* 60: 446–462. doi:10.1002/lno.10046
- Hsieh, C. H., K. Ishikawa, Y. Sakai, and others. 2010. Phytoplankton community reorganization driven by eutrophication and warming in Lake Biwa. *Aquat. Sci.* 72: 467–483. doi:10.1007/s00027-010-0149-4
- Hsieh, C. H., Y. Sakai, S. Ban, K. Ishikawa, T. Ishikawa, S. Ichise, N. Yamamura, and M. Kumagai. 2011. Eutrophication and warming effects on long-term variation of zooplankton in Lake Biwa. *Biogeosciences* 8: 1383–1399. doi:10.5194/bg-8-1383-2011
- Ismail, G. B., D. B. Sampson, and D. L. G. Noakes. 2014. The status of Lake Lanao endemic cyprinids (*Puntius* species) and their conservation. *Environ. Biol. Fishes* 97: 425–434. doi:10.1007/s10641-013-0163-1
- Izmest'eva, L. R., E. A. Silow, and E. Litchman. 2011. Long-term dynamics of Lake Baikal pelagic phytoplankton under climate change. *Inland Water Biol.* 4: 301–307. doi:10.1134/S1995082911030102
- Jaffé, R., F. Benitez, and S. Bohus. 1993. Assessment of eutrophication chronology via sediment core analyses: Case of Lake Valencia, Venezuela. *Fresenius Environ. Bull.* 2: 602–607.
- Jakob, L., D. V. Axenov-Gribanov, A. N. Gurkov, and others. 2016. Lake Baikal amphipods under climate change: thermal constraints and ecological consequences. *Ecosphere* 7: e01308. doi:10.1002/ecs2.1308
- Jassby, A. D., C. R. Goldman, and J. E. Reuter. 1995. Long-term change in Lake Tahoe (California-Nevada, U.S.A.) and its relation to atmospheric deposition of algal nutrients. *Arch. Für Hydrobiol.* 135: 1–21.
- Jose, A. M., and N. A. Cruz. 1999. Climate change impacts and responses in the Philippines: water resources. *Clim. Res.* 12: 77–84. doi:10.3354/cr012077
- Jury, M. R., and M. E. Gwazantini. 2002. Climate variability in Malawi, part 2: sensitivity and prediction of lake levels. *Int. J. Climatol.* 22: 1303–1312. doi:10.1002/joc.772
- Kaden, H., F. Peeters, A. Lorke, R. Kipfer, Y. Tomonaga, and M. Karabiyikoglu. 2010. Impact of lake level change on deep-water renewal and oxic conditions in deep saline Lake Van, Turkey. *Water Resour. Res.* 46: W11508. doi:10.1029/2009WR008555
- Kadioglu, M., Z. Sen, and E. Batur. 1997. The greatest soda-water lake in the world and how it is influenced by climatic change. *Ann. Geophys.-Atmospheres Hydrospheres Space Sci.* 15: 1489–1497. doi:10.1007/s00585-997-1489-9

- Karlsson, H., D. C. G. Muir, C. F. Teixeira, and others. 2000. Persistent chlorinatedp in air, water, and precipitation from the Lake Malawi Area, Southern Africa. *Environ. Sci. Technol.* 34: 4490–4495. doi:10.1021/es001053j
- Kelly, B., E. Mtiti, P. B. McIntyre, and Y. Vadeboncoeur. 2017. Stable isotopes reveal nitrogen loading to Lake Tanganyika from remote shoreline villages. *Environ. Manage.* 59: 264–273. doi:10.1007/s00267-016-0787-y
- Khan, V. M., R. M. Vilfand, and P. O. Zavialov. 2004. Long-term variability of air temperature in the Aral sea region. *J. Mar. Syst.* 47: 25–33. doi:10.1016/j.jmarsys.2003.12.006
- Kidd, K. A., H. A. Bootsma, R. H. Hesslein, W. Lyle Lockhart, and R. E. Hecky. 2003. Mercury Concentrations in the Food Web of Lake Malawi, East Africa. *J. Gt. Lakes Res.* 29: 258–266. doi:10.1016/S0380-1330(03)70553-X
- Kilincaslan, T. 2000. The rising water level in Lake Van: environmental features of the Van basin which increase the destructive effect of the disaster. *Water Sci. Technol.* 42: 173–177.
- Kitchell, J. F., D. E. Schindler, R. Ogutu-Ohwayo, and P. N. Reinthal. 1997. The Nile Perch in Lake Victoria: Interactions between predation and fisheries. *Ecol. Appl.* 7: 653–664. doi:10.1890/1051-0761(1997)007[0653:TNPILV]2.0.CO;2
- Knaap, M. V. der, K. I. Katonda, and G. J. D. Graaf. 2014. Lake Tanganyika fisheries frame survey analysis: Assessment of the options for management of the fisheries of Lake Tanganyika. *Aquat. Ecosyst. Health Manag.* 17: 4–13. doi:10.1080/14634988.2014.882733
- Kozhova, O.M., and L.A. Izhboldina 1993. Spread of *Elodea canadensis* in Lake Baikal. *Hydrobiologia* 259: 203-211
- Kolding, J., P. van Zwieten, O. Mkumbo, G. Silsbe, and R. Hecky. 2008. Are the Lake Victoria Fisheries Threatened by Exploitation or Eutrophication? Towards an ecosystem-based approach to management, p. 309–354. In G. Bianchi and H.R. Skjoldal [eds.], *Ecosystem Approach to Fisheries*. CABI Publishing.
- Kostoski, G., C. Albrecht, S. Trajanovski, and T. Wilke. 2010. A freshwater biodiversity hotspot under pressure – assessing threats and identifying conservation needs for ancient Lake Ohrid. *Biogeosciences* 7: 3999–4015. doi:10.5194/bg-7-3999-2010
- Kouraev, A. V., F. Papa, N. M. Mognard, P. I. Buharizin, A. Cazenave, J.-F. Cretaux, J. Dozortseva, and F. Remy. 2004. Sea ice cover in the Caspian and Aral Seas from historical and satellite data. *J. Mar. Syst.* 47: 89–100. doi:10.1016/j.jmarsys.2003.12.011
- Kraemer, B. M., S. Hook, T. Huttula, and others. 2015. Century-Long Warming Trends in the Upper Water Column of Lake Tanganyika. *PLOS ONE* 10: e0132490. doi:10.1371/journal.pone.0132490
- Kucklick, J. R., L. L. McConnell, T. F. Bidleman, G. P. Ivanov, and M. D. Walla. 1993. Toxaphene contamination in Lake Baikal's water and food web. *Chemosphere* 27: 2017–2026. doi:10.1016/0045-6535(93)90396-M
- Kuwahara, M., H. Takahashi, T. Kikko, S. Kurumi, and K. 'ichiro Iguchi. 2012. Introgression of *Oncorhynchus masou* subsp. (Biwa salmon) genome into lake-run *O. m. ishikawae* (Amago salmon) introduced into Lake Biwa, Japan. *Ichthyol. Res.* 59: 195–201. doi:10.1007/s10228-011-0270-y
- Langenberg, V. T., S. Nyamushahu, R. Roijackers, and A. A. Koelmans. 2003. External Nutrient Sources for Lake Tanganyika. *J. Gt. Lakes Res.* 29: 169–180. doi:10.1016/S0380-1330(03)70546-2

- Lehman, J. T. 1998. Role of Climate in the Modern Condition of Lake Victoria. *Theor. Appl. Climatol.* 61: 29–37. doi:10.1007/s007040050049
- Lehner, B., K. Verdin, and A. Jarvis. 2008. New global hydrography derived from spaceborne elevation data. *Eos Trans. AGU* 89: 93–94. doi:10.1029/2008EO100001
- Leonov, A. V., and O. V. Chicherina. 2009. Biomass development and production created by microorganisms of lower trophic levels in the Caspian Sea ecosystem: Analysis of mathematical modeling results. *Water Resour.* 36: 177–197. doi:10.1134/S0097807809020079
- Lindhorst, K., H. Vogel, S. Krastel, and others. 2010. Stratigraphic analysis of lake level fluctuations in Lake Ohrid: an integration of high resolution hydro-acoustic data and sediment cores. *Biogeosciences* 7: 3531–3548. doi:10.5194/bg-7-3531-2010
- Löffler, H., E. Schiller, E. Kusel, and H. Kraill. 1998. Lake Prespa, a European natural monument, endangered by irrigation and eutrophication? *Hydrobiologia* 384: 69–74. doi:10.1023/A:1003336027258
- Lopez, L., J. L. Mogollon, A. Aponte, and C. Bifano. 2000. Identification of anthropogenic organic contamination associated with the sediments of a hypereutrophic tropical lake, Venezuela. *Environ. Geochem. Health* 22: 55–74. doi:10.1023/A:1006715608508
- Lowe-McConnell, R. H. 1993. Fish Faunas of the African Great Lakes: Origins, diversity, and vulnerability. *Conserv. Biol.* 7: 634–643. doi:10.1046/j.1523-1739.1993.07030634.x
- Malaj, E., D. P. L. Rousseau, G. D. Laing, and P. N. L. Lens. 2012. Near-shore distribution of heavy metals in the Albanian part of Lake Ohrid. *Environ. Monit. Assess.* 184: 1823–1839. doi:10.1007/s10661-011-2081-z
- Manirakiza, P., A. Covaci, L. Nizigiyimana, G. Ntakimazi, and P. Schepens. 2002. Persistent chlorinated pesticides and polychlorinated biphenyls in selected fish species from Lake Tanganyika, Burundi, Africa. *Environ. Pollut.* 117: 447–455. doi:10.1016/S0269-7491(01)00188-9
- Marshall, B. E., C. N. Ezekiel, J. Gichuki, O. C. Mkumbo, L. Sitoki, and F. Wanda. 2013. Has climate change disrupted stratification patterns in Lake Victoria, East Africa? *Afr. J. Aquat. Sci.* 38: 249–253. doi:10.2989/16085914.2013.810140
- Matveyev, A. N., and V. P. Samusenok. 2015. The fishes and fishery in Lake Baikal. *Aquat. Ecosyst. Health Manag.* 18: 134–148. doi:10.1080/14634988.2015.1028868
- Matzinger, A., M. Schmid, E. Veljanoska-Sarafiloska, and others. 2007. Eutrophication of ancient Lake Ohrid: Global warming amplifies detrimental effects of increased nutrient inputs. *Limnol. Oceanogr.* 52: 338–353. doi:10.4319/lo.2007.52.1.0338
- Matzinger, A., Z. Spirkovski, S. Patceva, and A. Wüest. 2006. Sensitivity of Ancient Lake Ohrid to local anthropogenic impacts and global warming. *J. Gt. Lakes Res.* 32: 158–179. doi:10.3394/0380-1330(2006)32[158:SOALOT]2.0.CO;2
- McLean, K. A., A. Byanaku, A. Kubikonse, V. Tshowe, S. Katensi, and A. G. Lehman. 2014. Fishing with bed nets on Lake Tanganyika: a randomized survey. *Malar. J.* 13: 395. doi:10.1186/1475-2875-13-395
- Mesa, J., A. Bravo, J. Morales, L. Sanchez, P. Valle, E. Gutierrez, and H. Ledo. 2007. Content of trace metals in groundwater from western region of Maracaibo Lake, Venezuela. *Rev. Tec. Fac. Ing. Univ. Zulia* 30: 20–28.
- Mikkola, H. 2012. Implication of alien species introduction to loss of fish biodiversity and livelihoods on Issyk-Kul Lake in Kyrgyzstan. doi:10.5772/48460

- Minakawa, N., G. Sonye, G. O. Dida, K. Futami, and S. Kaneko. 2008. Recent reduction in the water level of Lake Victoria has created more habitats for *Anopheles funestus*. *Malar. J.* 7: 119. doi:10.1186/1475-2875-7-119
- Mito, S., Y. Sohrin, K. Norisuye, M. Matsui, H. Hasegawa, M. Maruo, M. Tsuchiya, and M. Kawashima. 2004. The budget of dissolved trace metals in Lake Biwa, Japan. *Limnology* 5: 7–16. doi:10.1007/s10201-003-0111-4
- Mitreski, K., and A. Naumoski. 2007. Dynamic model and estimation of the future eutrophication for the Lake Prespa. Proceedings of the 2nd IASME/WSEAS international conference on Energy and environment. Proceedings of the 2nd IASME/WSEAS International Conference on Energy and Environment. World Scientific and Engineering Acad and Soc. 44–49.
- Mitrofanov, I. V., and N. S. Mamilov. 2015. Fish diversity and fisheries in the Caspian Sea and Aral-Syr Darya basin in the Republic of Kazakhstan at the beginning of the 21(st) Century. *Aquat. Ecosyst. Health Manag.* 18: 160–170. doi:10.1080/14634988.2015.1028870
- Miyasaka, H., Y. V. Dzyuba, M. Genkai-Kato, and others. 2006. Feeding ecology of two planktonic sculpins, *Comephorus baicalensis* and *Comephorus dybowskii* (Comephoridae), in Lake Baikal. *Ichthyol. Res.* 53: 419–422. doi:10.1007/s10228-006-0360-4
- Mogollon, J. L., C. Bifano, and B. E. Davies. 1996. Geochemistry and anthropogenic inputs of metals in a tropical lake in Venezuela. *Appl. Geochem.* 11: 605–. doi:10.1016/0883-2927(96)00033-9
- Monroy, M., A. Maceda-Veiga, and A. de Sostoa. 2014. Metal concentration in water, sediment and four fish species from Lake Titicaca reveals a large-scale environmental concern. *Sci. Total Environ.* 487: 233–244. doi:10.1016/j.scitotenv.2014.03.134
- Moore, M. V., S. E. Hampton, L. R. Izmet'eva, E. A. Silow, E. V. Peshkova, and B. K. Pavlov. 2009. Climate Change and the World's "Sacred Sea"—Lake Baikal, Siberia. *BioScience* 59: 405–417. doi:10.1525/bio.2009.59.5.8
- Morales, J. A., A. Albornoz, E. Socorro, and A. Morillo. 2001a. An estimation of the nitrogen and phosphorus loading by wet deposition over Lake Maracaibo, Venezuela. *Water. Air. Soil Pollut.* 128: 207–221. doi:10.1023/A:1010347913832
- Morales, J. A., L. Sanchez, H. Velasquez, and others. 2001b. Nutrient loading by precipitation in the Maracaibo Lake Basin, Venezuela. *Water. Air. Soil Pollut.* 130: 511–516. doi:10.1023/A:1013874327002
- Mund, J.P., D. Murach, and A. Parplies. 2014. Monitoring and quantification of floating biomass on tropical water bodies. In: Vogler, R., Car, A., Strobl, J. and Griesebner, G. (Eds.): *GI_Forum 2014. Geospatial Innovation for Society*. doi: 10.1553/giscience2014s67
- Nandintsetseg, B., J. S. Greene, and C. E. Goulden. 2007. Trends in extreme daily precipitation and temperature near Lake Hovsgol, Mongolia. *Int. J. Climatol.* 27: 341–347. doi:10.1002/joc.1404
- Naumoski, A., and K. Mitreski. 2009. Climate change influence on diatoms bio-diversity in Lake Prespa, p. 25–30. In M. Jha, C. Long, N. Mastorakis, and C.A. Bulucea [eds.], *Environmental Science and Sustainability*. World Scientific and Engineering Acad and Soc.
- Neziri, A., E. Marku, and I. Malollari. 2016. Organochlorine pesticides concentrations in surface waters of Lakes of Shkodra, Ohrid and Prespa (albanian Part). *J. Environ. Prot. Ecol.* 17: 857–863.
- Nishimori, K., T. Kishida, and H. Matsuda. 1992. Forecasting of fishing condition of Ayu in Lake Biwa. *Nippon Suisan Gakkaishi* 58: 653–657.

- Njiru, M., P. Nzungi, A. Getabu, E. Wakwabi, A. Othina, T. Jembe, and S. Wekesa. 2007. Are fisheries management, measures in Lake Victoria successful? The case of Nile perch and Nile tilapia fishery. *Afr. J. Ecol.* 45: 315–323. doi:10.1111/j.1365-2028.2006.00712.x
- Nolan, M., and J. Brigham-Grette. 2007. Basic hydrology, limnology, and meteorology of modern Lake El'gygytgyn, Siberia. *J. Paleolimnol.* 37: 17–35. doi:10.1007/s10933-006-9020-y
- Ogutu-Ohwayo, R. 1990. The decline of the native fishes of lakes Victoria and Kyoga (East Africa) and the impact of introduced species, especially the Nile perch, *Lates niloticus*, and the Nile tilapia, *Oreochromis niloticus*. *Environ. Biol. Fishes* 27: 81–96. doi:10.1007/BF00001938
- Ogutu-Ohwayo, R., V. Natugonza, L. Musunguzi, M. Olokotum, and S. Naigaga. 2016. Implications of climate variability and change for African lake ecosystems, fisheries productivity, and livelihoods. *J. Gt. Lakes Res.* 42: 498–510. doi:10.1016/j.jglr.2016.03.004
- Oguz, A. R., and A. Yeltekin. 2014. Metal levels in the liver, muscle, gill, intestine, and gonad of Lake Van fish (*Chalcalburnus tarichi*) with abnormal gonad. *Biol. Trace Elem. Res.* 159: 219–223. doi:10.1007/s12011-014-9980-0
- Ohlendorf, C., M. Fey, C. Gebhardt, and others. 2013. Mechanisms of lake-level change at Laguna Potrok Aike (Argentina) - insights from hydrological balance calculations. *Quat. Sci. Rev.* 71: 27–45. doi:10.1016/j.quascirev.2012.10.040
- Orihel, D. M., O. Hadas, R. Pinkas, Y. Viner-Mozzini, and A. Sukenik. 2013. Internal nutrient loading may increase microcystin concentrations in freshwater lakes by promoting growth of *Microcystis* populations. *Ann. Limnol.-Int. J. Limnol.* 49: 225–235. doi:10.1051/limn/2013052
- Otu, M. K., P. Ramlal, P. Wilkinson, R. I. Hall, and R. E. Hecky. 2011. Paleolimnological evidence of the effects of recent cultural eutrophication during the last 200 years in Lake Malawi, East Africa. *J. Gt. Lakes Res.* 37: 61–74. doi:10.1016/j.jglr.2010.09.009
- Oyoo-Okoth, E., W. Admiraal, O. Osano, V. Ngure, M. H. S. Kraak, and E. S. Omutange. 2010. Monitoring exposure to heavy metals among children in Lake Victoria, Kenya: Environmental and fish matrix. *Ecotoxicol. Environ. Saf.* 73: 1797–1803. doi:10.1016/j.ecoenv.2010.07.040
- Ozyavas, A., and S. D. Khan. 2012. The driving forces behind the Caspian Sea mean water level oscillations. *Environ. Earth Sci.* 65: 1821–1830. doi:10.1007/s12665-011-1163-0
- Paterson, J. A., and L. J. Chapman. 2009. Fishing down and fishing hard: ecological change in the Nile perch of Lake Nabugabo, Uganda. *Ecol. Freshw. Fish* 18: 380–394. doi:10.1111/j.1600-0633.2009.00355.x
- Ponchaut, F., and A. Cazenave. 1998. Continental lake level variations from Topex/Poseidon (1993-1996). *Comptes Rendus Acad. Sci. Ser. II Fasc. -Sci.* 326: 13–20. doi:10.1016/S1251-8050(97)83198-9
- Popovska, C., and O. Bonacci. 2007. Basic data on the hydrology of Lakes Ohrid and Prespa. *Hydrol. Process.* 21: 658–664. doi:10.1002/hyp.6252
- Poste, A. E., D. C. G. Muir, M. K. Otu, R. I. Hall, and R. E. Hecky. 2012. Past and present mercury flux to a West African crater lake (Lake Bosomtwe/Bosumtwi, Ghana). *Sci. Total Environ.* 420: 340–344. doi:10.1016/j.scitotenv.2012.01.022

- Pourjomeh, F., and M. R. Shokri. 2016. Effect of sewage effluent on macro-invertebrate assemblages on rock and cement boulders in Mazandaran Province, Southern Caspian Sea. *Indian J. Geo-Mar. Sci.* 45: 778–783.
- Radevski, I., and S. Gorin. 2014. Stage frequency analysis on the Great Prespa Lake, p. 633–638. In *Geoconference on Water Resources, Forest, Marine and Ocean Ecosystems, Vol I* (sgem 2014). Stef92 Technology Ltd.
- Revenga, C., S. Murray, J. Abramovitz, and A. Hammond. 1998. Watersheds of the world: ecological value and vulnerability, World Resources Institute.
- van Rijssel, J. C., R. E. Hecky, M. A. Kishe-Machumu, and others. 2016. Climatic variability in combination with eutrophication drives adaptive responses in the gills of Lake Victoria cichlids. *Oecologia* 182: 1187–1201. doi:10.1007/s00442-016-3721-3
- Rimmer, A., G. Gal, T. Opher, Y. Lechinsky, and Y. Z. Yacobi. 2011a. Mechanisms of long-term variations in the thermal structure of a warm lake. *Limnol. Oceanogr.* 56: 974–988. doi:10.4319/lo.2011.56.3.0974
- Rimmer, A., A. Givati, R. Samuels, and P. Alpert. 2011b. Using ensemble of climate models to evaluate future water and solutes budgets in Lake Kinneret, Israel. *J. Hydrol.* 410: 248–259. doi:10.1016/j.jhydrol.2011.09.025
- Rivas, Z., J. Sanchez, F. Troncone, R. Marquez, H. Ledo de Medina, M. Colina, and E. Gutierrez. 2009. Total nitrogen and phosphorus from tributary Rivers to the Lake of Maracaibo System, Venezuela. *Interciencia* 34: 308–314.
- Roll, U., T. Dayan, D. Simberloff, and M. Goren. 2007. Characteristics of the introduced fish fauna of Israel. 2007. *Biological Invasions* 9: 813–824. doi: 10.1007/s10530-006-9083-8
- Z. Yasin, A. E. Kideys, A. T. S. Hwai, A. G. Khanari, and E. Eker-Develi. 2008. Impact of a new invasive ctenophore (*Mnemiopsis leidyi*) on the zooplankton community of the Southern Caspian sea. *Mar. Ecol.-Evol. Perspect.* 29: 421–434. doi:10.1111/j.1439-0485.2008.00254.x
- Roohi, A., Z. Yasin, A. E. Kideys, A. T. S. Hwai, A. G. Khanari, and E. Eker-Develi. 2008. Impact of a new invasive ctenophore (*Mnemiopsis leidyi*) on the zooplankton community of the Southern Caspian sea. *Mar. Ecol.-Evol. Perspect.* 29: 421–434. doi:10.1111/j.1439-0485.2008.00254.x
- Rosecchi, E., A. Crivelli, and G. Catsadorakis. 1993. The establishment and impact of *Pseudorasbora parva*, an exotic fish species introduced into Lake Mikri Prespa (north-Western Greece). *Aquat. Conserv.-Mar. Freshw. Ecosyst.* 3: 223–231. doi:10.1002/aqc.3270030306
- Ruban, G. I., and R. P. Khodorevskaya. 2011. Caspian Sea sturgeon fishery: a historic overview. *J. Appl. Ichthyol.* 27: 199–208. doi:10.1111/j.1439-0426.2011.01725.x
- Sahoo, G. B., A. L. Forrest, S. G. Schladow, J. E. Reuter, R. Coats, and M. Dettinger. 2016. Climate change impacts on lake thermal dynamics and ecosystem vulnerabilities. *Limnol. Oceanogr.* 61: 496–507. doi:10.1002/lno.10228
- Sahoo, G. B., S. G. Schladow, and J. E. Reuter. 2013. Hydrologic budget and dynamics of a large oligotrophic lake related to hydro-meteorological inputs. *J. Hydrol.* 500: 127–143. doi:10.1016/j.jhydrol.2013.07.024
- Salamat, A. U., J. Abuduwaili, and N. Shaidyldaeva. 2015. Impact of climate change on water level fluctuation of Issyk-Kul Lake. *Arab. J. Geosci.* 8: 5361–5371. doi:10.1007/s12517-014-1516-6

- Sapozhnikov, V. V., and M. P. Metreveli. 2000. Estimation of the present-day condition of the ecosystem of the Caspian Sea. *Oceanology* 40: 796–800.
- Sari, M. 2008. Threatened fishes of the world: *Chalcalburnus tarichi* (Pallas 1811) (Cyprinidae) living in the highly alkaline Lake Van, Turkey. *Environ. Biol. Fishes* 81: 21–23. doi:10.1007/s10641-006-9154-9
- Schneider, S. C., M. Cara, T. E. Eriksen, and others. 2014. Eutrophication impacts littoral biota in Lake Ohrid while water phosphorus concentrations are low. *Limnol. - Ecol. Manag. Inland Waters* 44: 90–97. doi:10.1016/j.limno.2013.09.002
- Shanahan, T. M., J. T. Overpeck, W. E. Sharp, C. A. Scholz, and J. A. Arko. 2007. Simulating the response of a closed-basin lake to recent climate changes in tropical West Africa (Lake Bosumtwi, Ghana). *Hydrol. Process.* 21: 1678–1691. doi:10.1002/hyp.6359
- Shibata, J., Z. 'ichi Karube, M. Oishi, M. Yamaguchi, Y. Goda, and N. Okuda. 2011. Physical structure of habitat network differently affects migration patterns of native and invasive fishes in Lake Biwa and its tributary lagoons: stable isotope approach. *Popul. Ecol.* 53: 143–153. doi:10.1007/s10144-010-0213-x
- Shimaraev, M. N., E. S. Troitskaya, and R. Y. Gnatovskii. 2009. Modern climate changes and deep water temperature of Lake Baikal. *Dokl. Earth Sci.* 427: 804–808. doi:10.1134/S1028334X09050213
- Sidle, R. C., A. D. Ziegler, and J. B. Vogler. 2007. Contemporary changes in open water surface area of Lake Inle, Myanmar. *Sustain. Sci.* 2: 55–65. doi:10.1007/s11625-006-0020-7
- Small, E. E., F. Giorgi, L. C. Sloan, and S. Hostetler. 2001. The Effects of Desiccation and Climatic Change on the Hydrology of the Aral Sea. *J. Clim.* 14: 300–322. doi:10.1175/1520-0442(2001)013<0300:TEODAC>2.0.CO;2
- Smiljkov, S., V. Bakeva, and M. Zikov. 2013. Statistical analyses of water level of Ohrid Lake, p. 301–308. In *Geoconference on Water Resources, Forest, Marine and Ocean Ecosystems*. Stef92 Technology Ltd.
- Sturmbauer, C., S. Baric, W. Salzburger, L. Rüber, and E. Verheyen. 2001. Lake level fluctuations synchronize genetic divergences of cichlid fishes in African Lakes. *Mol. Biol. Evol.* 18: 144–154. doi:10.1093/oxfordjournals.molbev.a003788
- Sudo, M., T. Kawachi, Y. Hida, and T. Kunitatsu. 2004. Spatial distribution and seasonal changes of pesticides in Lake Biwa, Japan. *Limnology* 5: 77–86. doi:10.1007/s10201-003-0115-0
- Sutcliffe, J. V., and G. Petersen. 2007. Lake Victoria: derivation of a corrected natural water level series / Lac Victoria: dérivation d'une série naturelle corrigée des niveaux d'eau. *Hydrol. Sci. J.* 52: 1316–1321. doi:10.1623/hysj.52.6.1316
- Tachikawa, T., M. Hato, M. Kaku, and A. Iwasaki. 2011. Characteristics of ASTER GDEM version 2. *Geoscience and Remote Sensing Symposium (IGARSS), 2011 IEEE International. Proceedings of the Geoscience and Remote Sensing Symposium (IGARSS), 2011 IEEE International.* 3657–3660.
- Tierney, J. E., M. T. Mayes, N. Meyer, C. Johnson, P. W. Swarzenski, A. S. Cohen, and J. M. Russell. 2010. Late-twentieth-century warming in Lake Tanganyika unprecedented since AD 500. *Nat. Geosci.* 3: 422–425. doi:10.1038/ngeo865
- Timoshkin, O. A., D. P. Samsonov, M. Yamamuro, and others. 2016. Rapid ecological change in the coastal zone of Lake Baikal (East Siberia): Is the site of the world's greatest freshwater biodiversity in danger? *J. Gt. Lakes Res.* 42: 487–497. doi:10.1016/j.jglr.2016.02.011

- Trajanovska, S., M. Talevska, A. Imeri, and S. C. Schneider. 2014. Assessment of littoral eutrophication in Lake Ohrid by submerged macrophytes. *Biologia (Bratisl.)* 69: 756–764. doi:10.2478/s11756-014-0365-9
- Tsuda, T., T. Nakamura, A. Inoue, and K. Tanaka. 2009. Pesticides in water, fish and shellfish from littoral area of Lake Biwa. *Bull. Environ. Contam. Toxicol.* 82: 716–721. doi:10.1007/s00128-009-9681-0
- Tsugeki, N. K., S. Ishida, and J. Urabe. 2009. Sedimentary records of reduction in resting egg production of *Daphnia galeata* in Lake Biwa during the 20th century: a possible effect of winter warming. *J. Paleolimnol.* 42: 155–165. doi:10.1007/s10933-008-9268-5
- Tsugeki, N. K., J. Urabe, Y. Hayami, M. Kuwae, and M. Nakanishi. 2010. Phytoplankton dynamics in Lake Biwa during the 20th century: complex responses to climate variation and changes in nutrient status. *J. Paleolimnol.* 44: 69–83. doi:10.1007/s10933-009-9386-8
- Tsugeki, N., H. Oda, and J. Urabe. 2003. Fluctuation of the zooplankton community in Lake Biwa during the 20th century: a paleolimnological analysis. *Limnology* 4: 101–107. doi:10.1007/s10201-003-0097-y
- Tsunoda, H., T. Urano, and M. Ohira. 2015. Comparison of food habits between native Amur three-lips (*Opsariichthys uncirostris uncirostris*) and non-native largemouth bass (*Micropterus salmoides*) in Lake Biwa, Japan. *Ann. Limnol.-Int. J. Limnol.* 51: 273–280. doi:10.1051/limn/2015021
- Tsydenova, O., T. B. Minh, N. Kajiwar, V. Batoev, and S. Tanabe. 2004. Recent contamination by persistent organochlorines in Baikal seal (*Phoca sibirica*) from Lake Baikal, Russia. *Mar. Pollut. Bull.* 48: 749–758. doi:10.1016/j.marpolbul.2003.10.027
- Turner, B. F., L. R. Gardner, and W. E. Sharp. 1996. The hydrology of Lake Bosumtwi, a climate-sensitive lake in Ghana, West Africa. *J. Hydrol.* 183: 243–261. doi:10.1016/0022-1694(95)02982-6
- Van Bocxlaer, B., and C. Albrecht. 2015. Ecosystem change and establishment of an invasive snail alter gastropod communities in long-lived Lake Malawi. *Hydrobiologia* 744: 307–316. doi:10.1007/s10750-014-2093-0
- Veljanoska-Sarafiloska, E., M. Jordanoski, T. Stafilov, and M. Stefova. 2011. Study of organochlorine pesticide residues in water, sediment and fish tissue in Lake Ohrid (Macedonia/Albania). *Maced. J. Chem. Chem. Eng.* 30: 163–179. doi:10.20450/mjce.2011.32
- Verdin, K.L. 2011. ISLSCP II HYDRO1k Elevation-derived Products. In F.G. Hall, G. Collatz, B. Meeson, S. Los, E. Brown de Colstoun, and D. Landis (Ed.), ISLSCP Initiative II Collection. Oak Ridge, Tennessee, U.S.A.: Data set. Available on-line [http://daac.ornl.gov/] from Oak Ridge National Laboratory Distributed Active Archive Center Villasmil, L., and J. Mendoza. 2001. Blue crab *Callinectes sapidus* (Decapoda : Brachyura) fishery in Lake Maracaibo, Venezuela. *Interciencia* 26: 301–306.
- Villwock, W. 1993. The Lake Titicaca region in the Peruvian and Bolivian Highlands and the consequences of introducing fishes for endemic ichthyofauna and their natural habitat. *Naturwissenschaften* 80: 1–8. doi:10.1007/BF01139750
- Walline, P. D., S. Pisanty, and T. Lindem. 1992. Acoustic assessment of the number of pelagic fish in Lake Kinneret, Israel. *Hydrobiologia* 231: 153–163. doi:10.1007/BF00018199
- Watanabe, M., S. Tanabe, R. Tatsukawa, M. Amano, N. Miyazaki, E. A. Petrov, and S. L. Khuraskin. 1999. Contamination levels and specific accumulation of persistent organochlorines in Caspian seal (*Phoca caspica*) from the Caspian Sea, Russia. *Arch. Environ. Contam. Toxicol.* 37: 396–407. doi:10.1007/s002449900531

- Weyl, O. L. F., A. J. Ribbink, and D. Tweddle. 2010. Lake Malawi: fishes, fisheries, biodiversity, health and habitat. *Aquat. Ecosyst. Health Manag.* 13: 241–254. doi:10.1080/14634988.2010.504695
- Williams, W., and N. Aladin. 1991. The Aral Sea - Recent limnological changes and their conservation significance. *Aquat. Conserv.-Mar. Freshw. Ecosyst.* 1: 3–23. doi:10.1002/aqc.3270010103
- Williams, W. D. 2002. Environmental threats to salt lakes and the likely status of inland saline ecosystems in 2025. *Environ. Conserv.* 29: 154–167. doi:10.1017/S0376892902000103
- Winder, M., J. E. Reuter, and S. G. Schladow. 2009. Lake warming favours small-sized planktonic diatom species. *Proc. R. Soc. Lond. B Biol. Sci.* 276: 427–435. doi:10.1098/rspb.2008.1200
- Wittmann, M. E., S. Chandra, J. E. Reuter, A. Caires, S. G. Schladow, and M. Denton. 2012. Harvesting an invasive bivalve in a large natural lake: species recovery and impacts on native benthic macroinvertebrate community structure in Lake Tahoe, USA. *Aquat. Conserv. Mar. Freshw. Ecosyst.* 22: 588–597. doi:10.1002/aqc.2251
- Yarsan, E., A. Bilgili, and İ. Türel. 2000. Heavy metal levels in mussels (*Unio stevenianus* Krynicki) Obtained From Van Lake. *Turk. J. Vet. Anim. Sci.* 24: 93–96.
- Yoshimizu, C., K. Yoshiyama, I. Tayasu, T. Koitabashi, and T. Nagata. 2010. Vulnerability of a large monomictic lake (Lake Biwa) to warm winter event. *Limnology* 11: 233–239. doi:10.1007/s10201-009-0307-3
- Zhang, X. S., J. M. Reed, J. H. Lacey, A. Francke, M. J. Leng, Z. Levkov, and B. Wagner. 2016. Complexity of diatom response to Lateglacial and Holocene climate and environmental change in ancient, deep and oligotrophic Lake Ohrid (Macedonia and Albania). *Biogeosciences* 13: 1351–1365. doi:10.5194/bg-13-1351-2016
- Zidana, H., G. F. Turner, C. Van Oosterhout, and B. Hänfling. 2009. Elevated mtDNA diversity in introduced populations of *Cynotilapia afra* (Günther 1894) in Lake Malawi National Park is evidence for multiple source populations and hybridization. *Mol. Ecol.* 18: 4380–4389. doi:10.1111/j.1365-294X.2009.04362.x