



Rapid deep-water renewal in Lake Issyk-Kul (Kyrgyzstan) indicated by transient tracers

Hofer, Markus, Frank Peeters, Werner Aeschbach-Hertig, Matthias Brennwald, Johannes Holocher, David M. Livingstone, Vladimir Romanovski, Rolf Kipfer

Limnol. Oceanogr., 47(4), 2002, 1210-1216 | DOI: 10.4319/lo.2002.47.4.1210

ABSTRACT: Simultaneous profiles of the transient tracers sulfur hexafluoride (SF_6), $^3H-^3He$, and the chlorofluorocarbons CFC-11 and CFC-12 were measured in Lake Issyk-Kul, a large, deep lake in Kyrgyzstan. Apparent water ages derived from these measurements suggest rapid mixing, with a deepwater renewal rate $>10\% \text{ yr}^{-1}$ at 650 m depth. SF_6 and $^3H-^3He$ ages agree reasonably well, whereas CFC ages are significantly greater. The discrepancy is explained by the nonlinear relationship between tracer age and tracer concentration and by the flattening of the atmospheric growth curves for CFCs. Novel to physical limnology is the application of SF_6 dating, which proves to be an excellent tool for the study of mixing in lakes, complementing $^3H-^3He$ and CFC dating techniques.

Article Links

[Download Full-text PDF](#)

[Return to Table of Contents](#)

Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for \$10 per article. All L&O articles are moved into Open Access after three years.