

## **Dissolved phosphate photo-released during sediment resuspension in shallow lakes**

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Unlike oceans and deep lakes, sediment resuspension occurs frequently in the shallow lakes due to the wind waves and bioturbation. The sedimentary organic phosphorus then re-enters the water column with sediment resuspension and releases dissolved phosphate by biotic and abiotic degradation. In this work, the process and mechanism of phosphate photo-released during sediment resuspension were studied. The results show that the resuspended sediment could release dissolved phosphate under sunlight irradiation. Sequential extraction and <sup>31</sup>P-NMR demonstrated that the release of phosphate should be attributed to the photo-degradation of organic phosphorus in resuspended sediments, as the effects of the biomineralization process are eliminated by sterilization and filtration. The surface sediments containing more organic phosphorus promoted more dissolved phosphate photo-released. And the photo-release amount of phosphate increased with the trophic levels of lakes. The results of the reactive oxygen molecule probe indicated that the hydroxyl radical generated by natural photosensitizers, such as NO<sub>3</sub><sup>-</sup>, Fe<sup>3+</sup> and DOM, is the driving force for photo-degradation of organic phosphorus. All these results indicate that the photo-release of phosphate may be a potential pathway for the bioavailability phosphorus supplement in shallow lakes.

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