Application of remote sensing method for detecting and monitoring water contamination

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With the global shortage of fresh water resources and freshwater ecosystems continue to be disrupted, the traditional research based on the objectives and methodology of single-disciplinary, has difficulties to face the complexity of the new challenges of global environmental changes. Beijing as the capital of China, due to continuous years of drought, the amount of available water resources has been greatly attenuated. Two drinking water reservoirs for residents, the Miyun reservoir and Guanting reservoir are only 7.2 billion and 2 billion m3 respectively. In recent years, additionally with water pollution and water quality issues, making available drinking water situation is quite serious. Remote sensing techniques play an important role recently in frequent deterioration of the status of aquatic ecology for drinking water. In this study, landsat imagery was used to detect and monitor water quality in Guanting Reservoir, Beijing, China. This talk will focus on the use of remote sensing technique to determine the nature and extent of water pollution from nitrogen materials which have much more effects on the quality of drinking water in Guanting Reservoir .

Under the auspices of National Natural Science Foundation of China (No.40901026) & Supported by Beijing Municipal Science & Technology New Star Project Funds (No.2010B046)

Equilibrium isotope fractionation calculation beyond harmonic level

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The Bigeleisen-Mayer equation has been the theoretical corner-stone of stable isotope geochemistry for decades. The advantage of using this method is that it largely simplified the calculation procedure by cancelling out as many identical energy terms as possible before the final numerical calculation, concentrating on the vibrational frequency shifts of the different isotopologues. However, Bigeleisen-Mayer equation is purely based on harmonic vibration and rigid rotator approximations. In this study, corrections beyond the harmonic level to the Bigeleisen-Mayer equation have been discussed and compared. The hindered internal rotation correction on isotope effects is found to be significant for H/D exchanges of some organic molecules. Anharmonic correction for ZPE, including the G_0 term, has been found to be very important for all kinds of isotope exchange reactions. For the H/D exchange reactions, almost all the high order corrections discussed in this study are important. The temperature dependences of six higher-order corrections are checked. These higher-order corrections are strongly suggested to be included not only for H/D exchanges but also for several other non-H/D exchange reactions, such as those in B isotope and clumped isotope systems.

[1] Qi Liu, John A. Tossell & Yun Liu*(2010) On the proper use of the Bigeleisen-Mayer equation & corrections to it in the calculation of isotopic fractionation equilibrium constants. *Geochimica et Cosmochimica Acta* **74**, 6965–6983.