Wednesday, October 10
Poster Session 3
16:00–18:00

Poster 151

IMPACT OF VISIBLE SOLAR RADIATION IN THE UPPER WATER COLUMN ESTIMATED FROM REMOTE SENSING ON TEMPERATURE AND MIXING IN UPPER OCEAN

The penetration of visible solar radiation in the upper ocean contributes to heating in the upper water column and this impact is modulated by constituents in water. Many models have been developed and used in dynamic ocean circulation models to include this factor. A recent study, however, found that the estimated transmission of visible solar radiation in the upper water column based on remotely-sensed chlorophyll concentration (Chl) has large uncertainties when compared with in situ measurements. It also found that the agreement in transmission is significantly better, especially for more turbid waters, when it was estimated centered on waters' inherent optical properties (IOPs). It is thus necessary to know to what extent such a transmission based on IOPs will affect upper layer heating and mixing when compared with traditional approaches based on Chl. We thus employed a 1-D ocean circulation model based on ROMS and compared the resulted temperature and mixing status to that obtained with the conventional Chl-based schemes. The results show that, although all used the same boundary conditions and ocean color information, these photosynthetically available radiation (PAR) vertical profiles resulted in different vertical temperature and upper water mixing, where the difference in temperature can be up to ~2°C while the mixed layer depth can be up to ~50 m. These results further advocate the application of IOPs products from satellite remote sensing to study the upper water dynamics and air-sea interactions in the global oceans.

Tongtong Liu, Xiamen University, y2_ltt@qq.com, https://orcid.org/0000-0001-5264-8608
Zhongping Lee, School for the Environment, University of Massachusetts Boston, zhongping.lee@umb.edu
Shaoping Shang, Key Laboratory of Underwater Acoustic Communication and Marine Information Technology, spshang@xmu.edu.cn