

Spatial Distribution of Sea-surface Chlorophyll *a* from Bering Sea to Chukchi Sea and Impact Factors Analysis During Summer of 2014

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Nowadays, the study method about the Arctic Ocean surface seawater chlorophyll distribution and primary productivity could be divided into satellite remote-sensing of ocean color (CZCS, Sea WiFS and MODIS) and *in situ* sea water sample collection. For satellite remote-sensing, the advantages are wide coverage and large data volume, but the accuracy is pretty low, so a small scale changes would be ignored easily. *In situ* water samples collection usually with high accuracy, but due to the sampling conditions limitation, data volume is woefully inadequate. During the 6th Chinese Arctic scientific expedition (2014.07.11~2014.09.22), in the clean water laboratory on the *XUELONG*, surface multi-elements continuous automatic measurement system was loaded. Through water pump suction, seawater got into the ferry box, in which WETStar fluorimeter and automatic sensors SEB21 was loaded. WETStar fluorimeter could detect surface waters chlorophyll *a* concentration while SEB21 could detect temperature and salinity. The system could guarantee recording temperature, salinity and chlorophyll *a* data of the surface seawater every 30 seconds automatically, the GPS recorded the latitude and longitude data synchronously, so 179,500 lists of raw data were collected in total, after dealing with the raw data, 51,776 lists was remained in total. The data volume is not only adequate but also accurate, so it could overcome the shortcomings of conventional methods and integrate the advantages. Due to the study area is the Arctic Ocean, so we only take the 140,478 lists of data south of 60°S. We divided the Arctic Ocean into 4 waters, followed by the Bering sea basin (160°E, 50°N~170°W, 60°N), the Bering sea shelf (175°E, 60°N~160°W, 66°N), the Chukchi sea (180°, 66°N~160°W, 80°N), and the Canada basin (160°W, 70°N~140°W, 82°N). The whole forward trip (07.11~08.26) has passed the Bering sea basin - the Bering sea shelf - the Chukchi sea - the Canada basin in turn, the return trip (08.26~09.14) has passed the Canada basin - the Chukchi sea – the Bering strait in turn. Due to the

poor continuity of return trip data, we only discuss the forward trip data. The chlorophyll *a* concentration average value is 1.166 mg m^{-3} , variation range is $0.06\sim 8.283 \text{ mg m}^{-3}$, and it decreased from south to north obviously, the corresponding temperature and salinity decreased from south to north similarly. In the 4 areas, the average chlorophyll *a* concentration of the Bering sea basin is the highest, 4.196 mg m^{-3} , followed by the Bering sea shelf, the Chukchi sea and the Canada basin. In order to study the impact factors for the chlorophyll *a* distribution in the study areas, Pearson correlation analysis was used among chlorophyll *a* concentration, temperature, salinity and solar altitude, which showed that in Bering Sea to Chukchi Sea, excessive low salinity is unfavorable factor, temperature and illumination levels has little impact. Another important influence factor is nutrient level which is associated with the currents changes in the study area.