时空三极环境大数据平台

**Ross Sea productivity**

英文标题：Ross Sea productivity

1、摘要

Polar systems are undersampled due to the difficulty of sampling remote and challenging environments; however, these systems are critical components of global biogeochemical cycles. Measurements on primary productivity in specific areas can quantify the input of organic matter to food webs, and so are of critical ecological importance as well. However, long-term measurements using the same methodology are available only for a few polar systems. Primary productivity measurements using 14C-uptake incubations from the Ross Sea, Antarctica, are synthesized, along with chlorophyll concentrations at the same depths and locations. A total of 19 independent cruises were completed, and 449 stations occupied where measurements of primary productivity (each with 7 depths) were completed. The incubations used the same basic simulated in situ methodology for all. Integrated water column productivity for all stations averaged 1.10 ± 1.20 g C m-2 d-1, and the maximum was 13.1 g C m-2 d-1. Annual productivity calculated from the means throughout the growing season equalled 146 g C m-2 yr-1. The mean chlorophyll concentration in the euphotic zone (the 1% irradiance level) was 2.85 ± 2.68 mg m-3 (maximum observed concentration was 19.1 mg m-3). Maximum photosynthetic rates above the 30% isolume (normalized to chlorophyll) averaged 0.98 ± 0.71 mg C (mg chl)-1 h-1, similar to the maximum rate found in photosynthesis-irradiance measurements. Productivity measurements are consistent with the temporal patterns of biomass found previously, with biomass and productivity peaking in late December; mixed layers were at a minimum at this time as well. Estimates of plankton composition also suggest that pre-January productivity was largely driven by the haptophyte Phaeocystis antarctica, and summer productivity by diatoms. The data set will be useful for a comparison to other Antarctic regions and provide a basis for refined bio-optical models of regional primary productivity and biogeochemical models for the Southern Ocean.

2、关键词

主题关键词：productivity,haptophytes,Mixed layer,海洋生物,diatoms,chlorophyll,Irradiance,物理海洋  
学科关键词：海洋  
地点关键词：Ross Sea, Southern Ocean  
时间关键词：seasonal

3、数据细节

1.比例尺：None

2.投影：

3.文件大小：1.5MB

4.数据格式：None

4、空间范围

|  |  |  |
| --- | --- | --- |
| - | 北：-71.0 | - |
| 西：150.0 | - | 东：163.0 |
| - | 南：78.5 | - |

5、时间范围None--None

6、引用方式

数据的引用:

Walker O. Smith. Ross Sea productivity. 时空三极环境大数据平台, DOI:10.26008/1912/bco-dmo.863815.2, CSTR:, 2022.[SMITH O. Walker . . A Big Earth Data Platform for Three Poles, DOI:10.26008/1912/bco-dmo.863815.2, CSTR:, 2022]

文章的引用:

Smith, W.O., Jr. (2022). Primary productivity measurements in the Ross Sea, Antarctica: A regional synthesis. Earth Syst. Science Data (in press). https://doi.org/10.5194/essd-2021-351

7、资助项目信息

像元尺度地表发射率方向性建模及地表温度遥感反演研究

8、数据资源提供者

姓名: Walker O. Smith  
单位: Shanghai Jiao Tong University  
电子邮件: wos@vims.edu