ReadMe file:
SBI: HLY-04-02 and HLY-04-03 data from Dr. Victoria Hill

TITLE: HPLC pigment data

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FUNDING SOURCE AND GRANT NUMBER: NSF – OPP – 0125049

DATA SET OVERVIEW:

High Performance Liquid Chromatography (HPLC) pigment data

Data is from two cruises in the Chukchi and Beaufort Seas onboard the USCGC Healy WAGB-20 during the spring (HLY-04-02) and summer (HLY-04-03) of 2004 as part of the SBI phase II project.

Time period covered by the data:
Spring cruise (HLY-04-02) 18 May 2004 to 20 June 2002.
Summer cruise (HLY-04-03) 20 July 2002 to 23 August 2002.

Physical location of the measurement
Spring cruise (HLY-04-02) Arc2004-1
Min Lat: 67.49505; Max Lat: 73.13385 (North)
Min Lon:-168.921; Max Lon:-154.299 (West)
Summer cruise (HLY-04-03) Arc2004-2
Min Lat: 67.35578; Max Lat: 73.78698 (North)
Min Lon: -188.896; Max Lon: 1152.023 (West)

INSTRUMENT DESCRIPTION:

Analysis of samples was performed by J. R. Perl and C. C. Trees at the Center for Hydro-Optics and Remote Sensing, San Diego State University. The HPLC method used was that proposed by Wright et al. (1991). Pigments were separated on the ODS-2 C18 column using a three solvent gradient system at a flow rate of one ml per min. The separation of the various pigments requires 25 minutes with the pigment peaks being detected by a absorption detector; a ThermoQuest UV6000 scanning diode array detector (190 to 800 nm at 1 nm resolution). In addition, a ThermoQuest FL3000 scanning fluorescence detector was used to detect and quantify the various chlorophyll degradation products, which occur at lower concentrations.

DATA COLLECTION and PROCESSING:

Samples were collected at the surface and at the chlorophyll max, identified from the in situ fluorometer on the CTD. Samples were filtered in low light and temperature conditions onto 25mm GF/F filters (nominal pore size 0.7um), in some cases an additional sample was filtered through a 5um membrane. Samples were then placed immediately in the -80$^{o}$C freezer. They were then shipped to San Diego in dry ice.

They were extracted in 4 mls of 100% acetone. With a filter and sample the water retention is about 0.2 to 0.3 ml and equates to about a 92-95% acetone extraction solution. After 24 hours of extraction in a freezer (-20$^{o}$C), the samples were sonicated for 10 seconds using a microprobe tip at a 60% duty cycle. They were then extracted again for 24 hours. Glass-fiber particles, generated during sonication, were removed from the extract by centrifugation and filtration using 0.2 um PTFE in-line filters. An internal pigment standard (canthaxanthin, which is normally not found in samples) was added to the extract to correct for any extraction volume changes during sample processing. Since canthaxanthin is a carotenoid and does not fluoresce, it does not affect the fluorometric analysis.

**PIGMENT NOMENCLATURE (*Matches SeaBASS Field Names*)**

| Parameters | Description | Units |
|---|---|---|
| Beta-epi-Car | Alpha carotene | mg $m^{-3}$ |
| Allo | Alloxanthin | mg $m^{-3}$ |
| Beta-beta-Car | Beta carotene | mg $m^{-3}$ |
| But-fuco | 19'-Butanolyoxyfucoxanthin | mg $m^{-3}$ |
| Chlide_a | Chlorophylide a | mg $m^{-3}$ |
| Chl_b | Chlorophyll b | mg $m^{-3}$ |
| Chl_c2 | Chlorophyll c2 | mg $m^{-3}$ |
| Chl_c1 | Chlorophyll c1 | mg $m^{-3}$ |
| Chl_c3 | Chlorophyll c3 | mg $m^{-3}$ |
| Diadino | Diadinoxanthin | mg $m^{-3}$ |
| Diato | Diatoxanthin | mg $m^{-3}$ |
| Fuco | Fucoxanthin | mg $m^{-3}$ |
| Gyro | Gyroxanthin-Diester | mg $m^{-3}$ |
| Hex-fuco | 19'-Hexanoyloxyfucoxanthin | mg $m^{-3}$ |
| Lut | Lutein | mg $m^{-3}$ |
| Neo | Neoxanthin | mg $m^{-3}$ |
| Perid | Peridinin | mg $m^{-3}$ |
| Phide_a | Pheophorbide a | mg $m^{-3}$ |
| Phytin_a | Pheophytin a | mg $m^{-3}$ |
| Pras | Prasinoxanthin | mg $m^{-3}$ |
| Viola | Violaxanthin | mg $m^{-3}$ |
| Zea | Zeaxanthin | mg $m^{-3}$ |
| Chl_a | Chlorophyll a | mg $m^{-3}$ |
| Chl_a_allom | Chlorophyll a allomers | mg $m^{-3}$ |
| Chl_prime | Chlorophyll a epimer | mg $m^{-3}$ |
| MV_Chl_a | Monovinyl chlorophyll a | mg $m^{-3}$ |
| MV_Chl_b | Divinyl chlorophyll b | mg $m^{-3}$ |
| DV_Chl_a | Divinyl chlorophyll a | mg $m^{-3}$ |
| DV_Chl_b | Monovinyl chlorophyll b | mg $m^{-3}$ |

DATA FORMAT:
Data is in SeaBASS format (ASCII) tab delimited with a SeaBASS header. The headers include parameters, units, time, location, and other Meta data.

DATA REMARKS:
Missing or questionable data was not included in the submitted data set or is noted in the header information of the file.

REFERENCES:

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Latasa, M., R.R. Bidigare, M.E. Ondrusek and M.C. Kennicutt II. 1996. HPLC analysis of algal pigments: a comparison exercise among laboratories and recommendations for improved analytical performance. Mar Chem. 51: 315-324.

Trees, C.C., R..R. Bidigare, D.N. Karl and L. Van Heukelem. 2000. Fluorometric chlorophyll a: sampling, laboratory methods, and data analysis protocols. In: G.S. Fargion and J.L. Mueller (Eds.) Ocean Optics Protocols for Satellite Ocean Color Sensor Validation, Revision 2, Chapter 14. NASA TM 2000-209966, Goddard Space Flight Center, Greenbelt, MD. pp:162-169.

Wright, S.W., S.W. Jeffrey, R.F.C. Mantoura, C.A. Llewellyn, T. Bjornland, D. Repeta and N. Welschmeyer. 1991. Improved HPLC method for the analysis of chlorophylls and carotenoids from marine phytoplankton. Mar. Ecol. Prog. Ser. 77: 183.