HPLC Phytoplankton Pigment Measurements: Continuation of Climate Quality Data Records (CQDR) in Support of NASA's Earth Science Enterprise (ESE)

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HPLC Phytoplankton Pigment Protocols

(Bidigare *et al.,* 2003; NASA/TM-2003-211621/Rev 4 - Vol. V)

MODIS Data Products Program - <u>4,825 samples/yr</u>

Method Comparison

Co-elution of mono- and divinyl Chl *a*

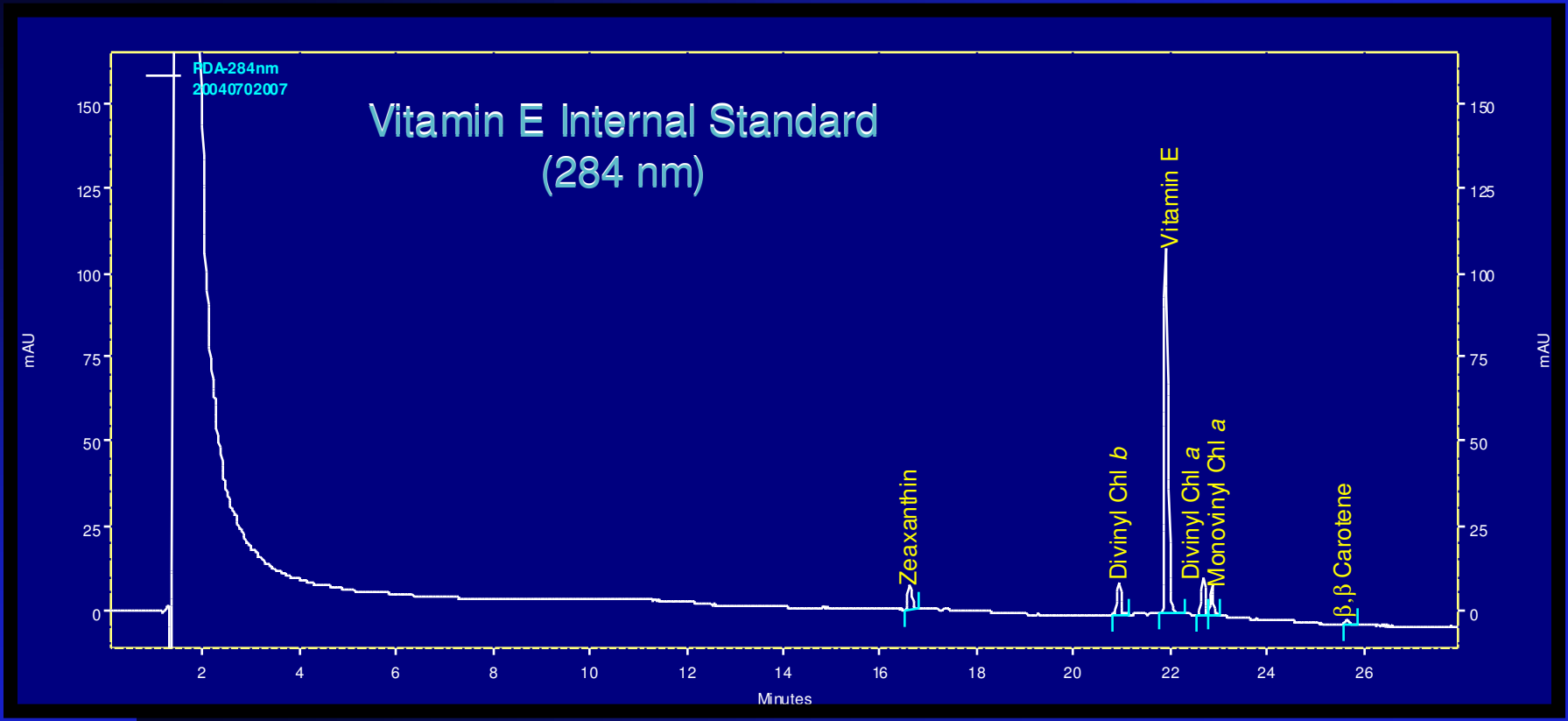
1. **Wright *et al.* (1991) C_{18} Method (SIMBIOS)**

   Channels ratio (436 & 450nm)

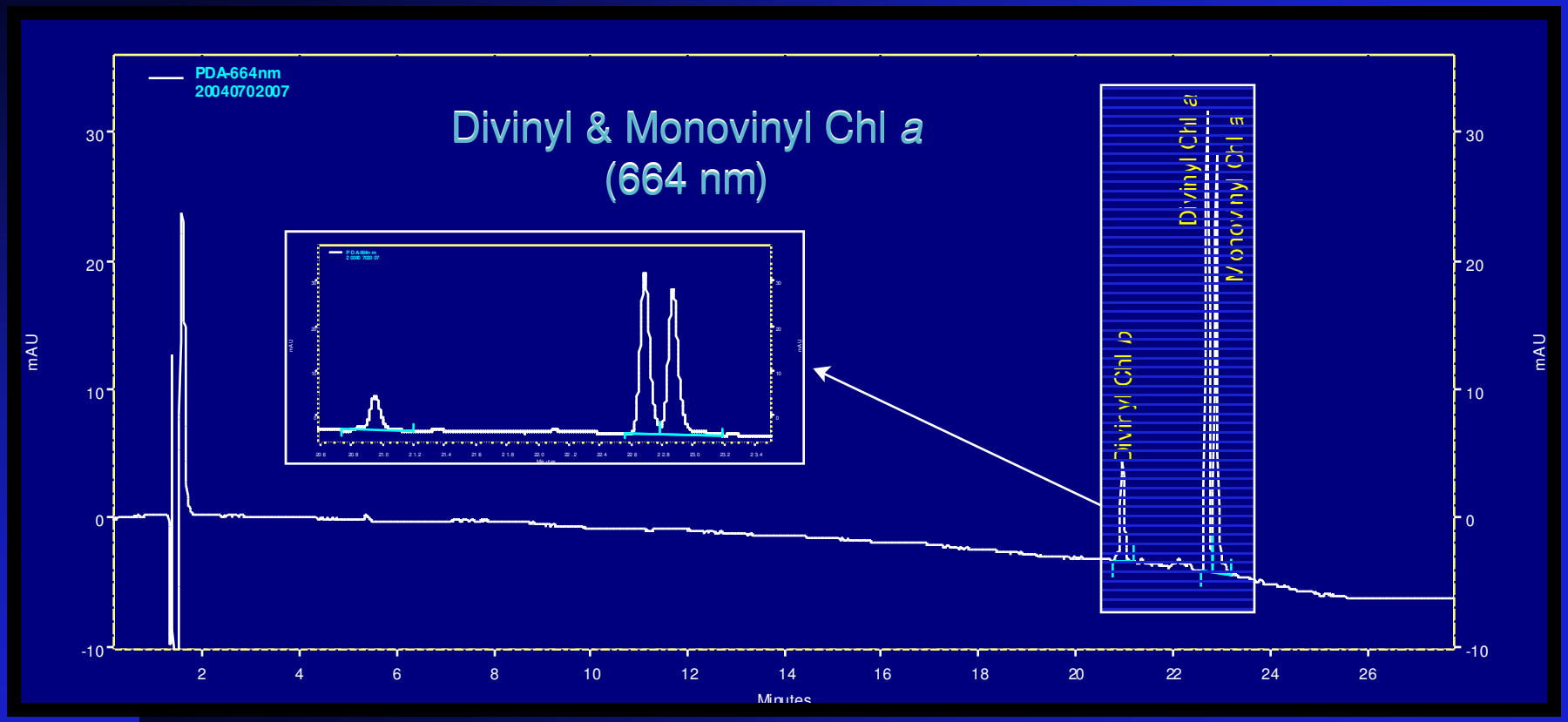
Physical separation of mono- and divinyl chl *a*

1. **Goericke and Repeta (1993) C_8 Method**
2. ****Van Heukelem and Thomas (2001) C_8 with column heater Method**

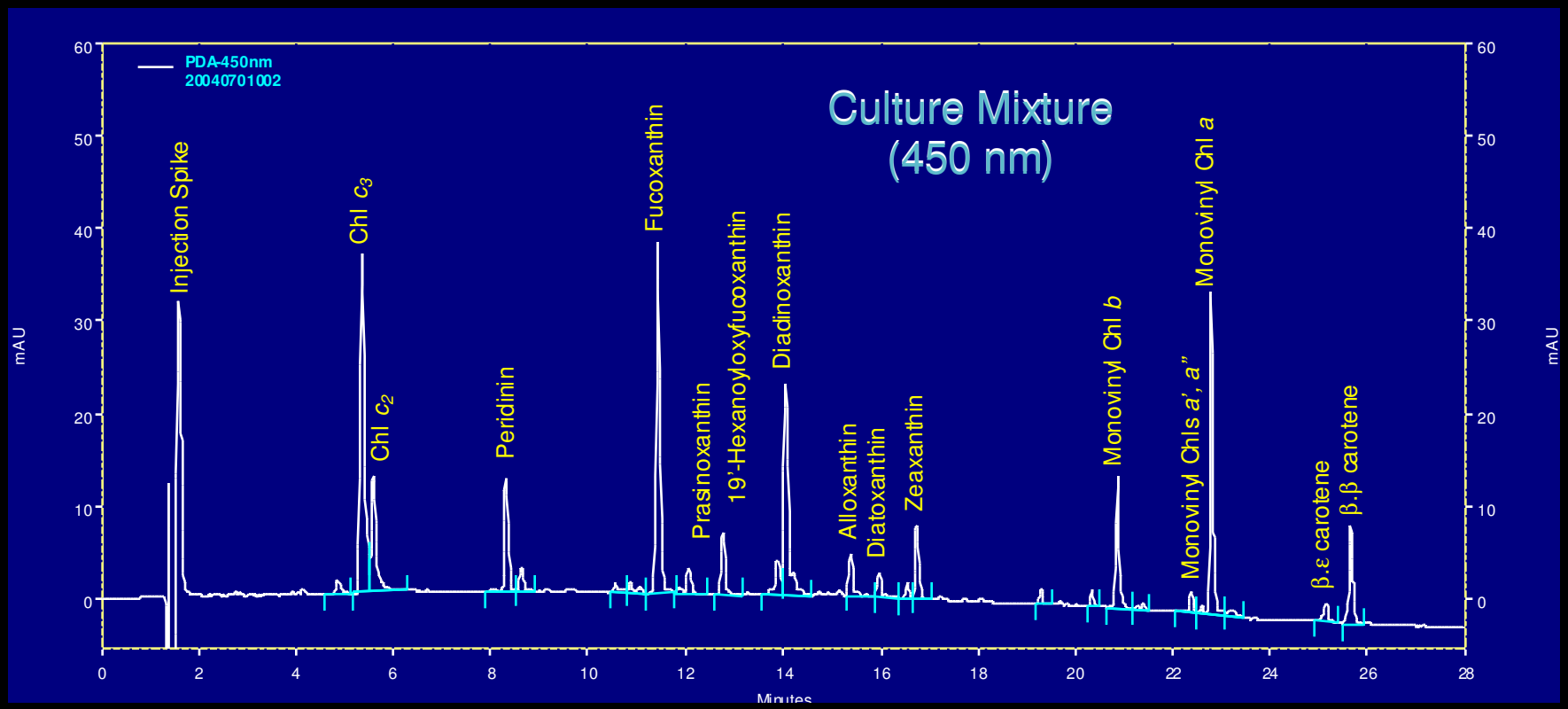
Internal Standard



Divinyl and Monovinyl Chl *a* Separation



Mixture of Pigments from Cultures



HPLC Samples Requested

Investigators	Agency/Program	Cruise Name	HPLC Samples FY04-05	HPLC Samples FY05-06	HPLC Samples FY06-07
Campbell	NASA MODIS	Intercal/Dowell's Grant	50	50	50
Carder	NASA MODIS	HAB's	50	50	50
Clark	NASA MODIS	MOBY	400	0	0
Cota	NASA MODIS	Polar Work	300	300	300
Dierssen	NASA MODIS	Ackleson/ Rhode Island	50	50	50
Gould	NASA MODIS	Coastal Optical Cruises	200	200	200
Hooker	NASA MODIS	SeaHARRE-3 (1st yr) & Cr.	90	125	125
Letelier	NASA MODIS	GLOBEC (previous cruises)	200	0	0
Marra	NASA MODIS	Ship of Opportunity	50	50	50
Muller-Karger	NASA MODIS	Cariaco Basin	230	230	230
Nelson	NASA MODIS	BBOP	50	50	50
Siegel	NASA MODIS	Plumes & Blooms	450	450	450
Stramski	NASA MODIS	Carbon/High Latitude	200	200	50
Stumpf	NASA MODIS	Estuarine and Coastal	100	100	100
MODIS EOS Total			**2,420**	**1,855**	**1,705**
Chavez	NASA (3 grants)		250	250	250
Lorenzen	NASA Ecohab	Gulf of Mexico	0	0	0
Mannino	NASA IDS		120	120	120
Mannino	NASA NIP		0	135	135
Mitchell	NASA Ecohab	Gulf of Mexico/California	200	200	400
Moline	NASA NIP		100	200	200
Siegel and Nelson	NASA Core	Repeat Survey CDOM	250	250	0
Sosik	NASA IDS	North Atlantic Bight	100	100	100
Subramaniam	NASA Core		125	0	0
Other NASA Total			**1,145**	**1,255**	**1,205**
NASA TOTAL			**3,565**	**3,110**	**2,910**

Investigators	Agency/Program	Cruise Name	FY04-05	FY05-06	FY06-07
Mitchell	NOAA	AMLR	204	0	0
Mitchell	NSF	Blue Water Zone Cr	256	0	0
Moline	NSF	Monterey Bay	200	300	300
Siegel and McGillicuddy	NSF	EDDIES	600	1,200	0
TOAL REQUESTED			**4,825**	**4,610**	**3,210**

HPLC Phytoplankton Pigment Protocols

Filtration

1. GF/F glass fiber filters (25 mm)
2. Positive pressure filtration recommended
3. Filtration Volumes (green as possible)
    a. Oligotrophic waters - 3-4 liters
    b. Mesotrophic waters - 1-2 liters
    c. Eutrophic waters - 0.5-1 liter

Sample Handling, Storage and Shipping

1. Fold filters in half with filtered sides facing in.

HPLC Phytoplankton Pigment Protocols

Sample Handling, Storage and Shipping (cont)

2. Place in aluminum foil envelops, cryogenic vials or HistoPrep tissue capsules.
3. Label samples with a sequential number.
4. Store and ship (dry shipper) in liquid nitrogen (LN_2).
5. PI's pay for all shipping costs (includes costs for returning LN_2 shipping container to PI).

Recordkeeping (<u>electronically transmitted to CHORS</u>)

1. For each sample the volume filtered, station number, date, time, depth, lat and long will be sent.

Positive Pressure Filtration System

Bottle Cap Valves/Hardware

Positive Pressure Filtration System

- Nalgene LDPE Carboys with Tubulation, Fisher (2L #02-962B & 4L #02-962C)
- Nalgene Polypropylene Stopcocks with PTFE Plug, Fisher (2mm #14-630-1A)
- Tee Barbed Fitting, Cole Palmer (1/4" #U06462-20)
- Elbow Barbed Fitting, Cole Palmer (1/4" #U06461-10)
- In-Line Delrin Filter Holder, VWR (25mm, Pall Gelman #28144-255)
- PVC Labcock Valve, RyanHerco (1/4" MT X H #5309.102)
- PVC Bushing N870, RyanHerco (1/2x1/4" MTXT Spear #3839S072)
- Gast Oil less Diaphragm-Type Pressure/Vacuum Pump, Fisher (#01-092-29)

Liquid Nitrogen Refrigerator (Dry Shipper)

Taylor-Wharton Cryogenics

Model Number 3DS
- LN2 Capacity - 3 liters
- *Static Hold Time - 20 days
- *Working Time - 14 days

Hard-shell Shipping Case

*Nominal values

Midwest Scientific (www.midsci.com)
Thermolyne Arctic Express (Fisher)
Taylor-Wharton CX Series (Cole-Parmer)
Taylor-Wharton LD Model CP30 (VWR)