NOAA SOOP/CO_2 effort

Funded by the NOAA Climate Program Office

Participating institutions

NOAA/AOML

NOAA/PMEL

Columbia U./LDEO

Bermuda BIOS

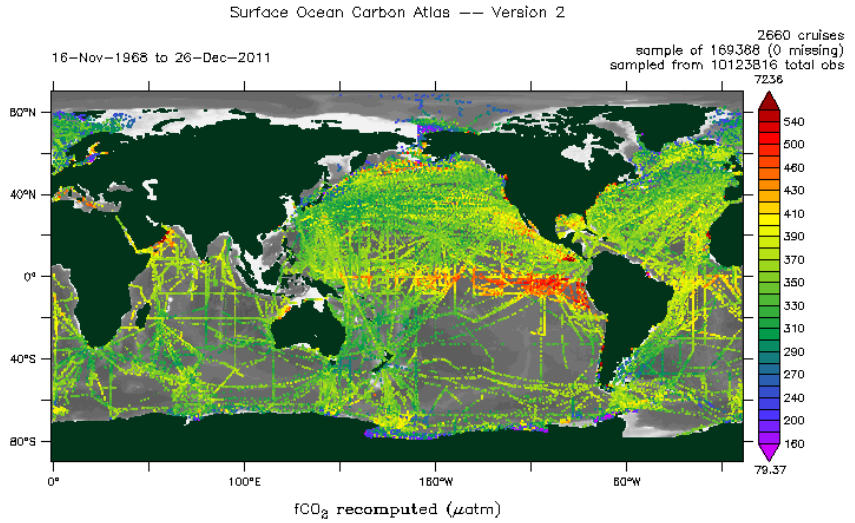
U. Miami/RSMAS

AOML/TSG

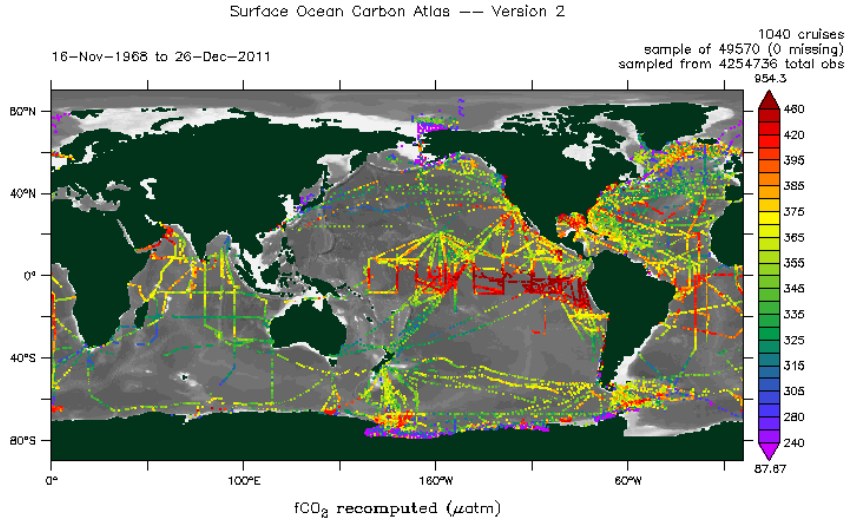
14 ships

Coverage of NOAA SOOP/CO_2 Effort

Total coverage of SOCAT 2
10 M data points



NOAA/CPO/COD USA contribution
4 M data points

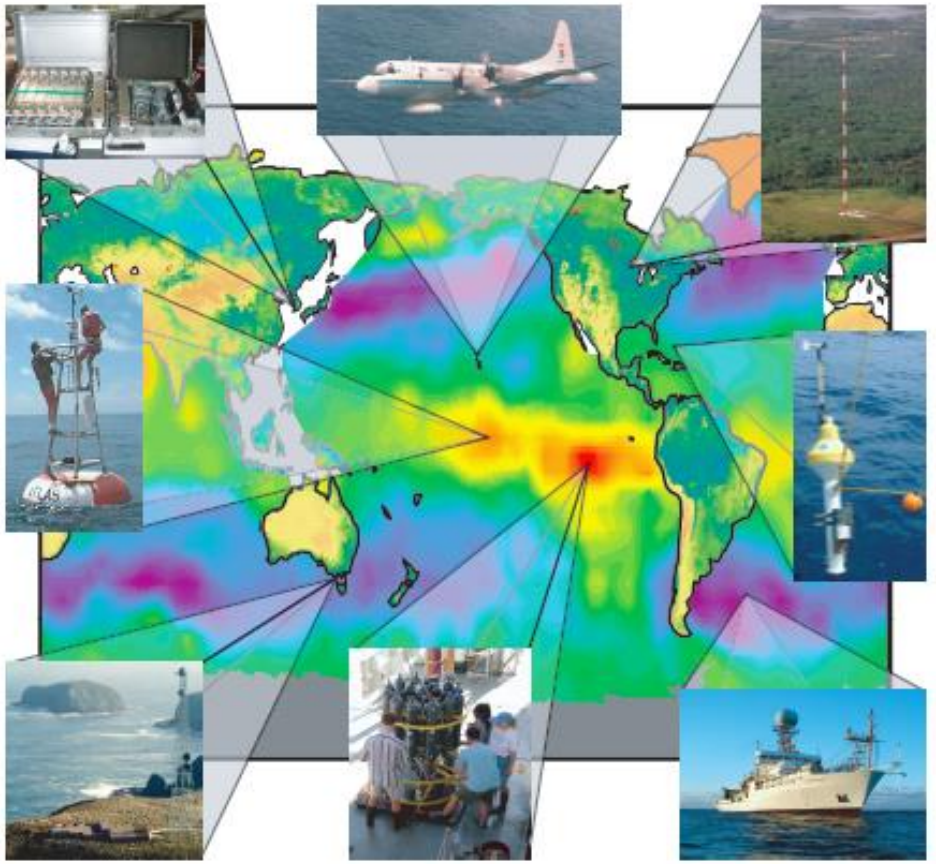


Data from the Albert Rickmers,Cap Victor,Columbus Waikato,Explorer of the Seas,Falstaff,Gordon Gunter,Henry B. Bigelow,Ka imimoa

Objectives and rational laid out in an implementation strategy

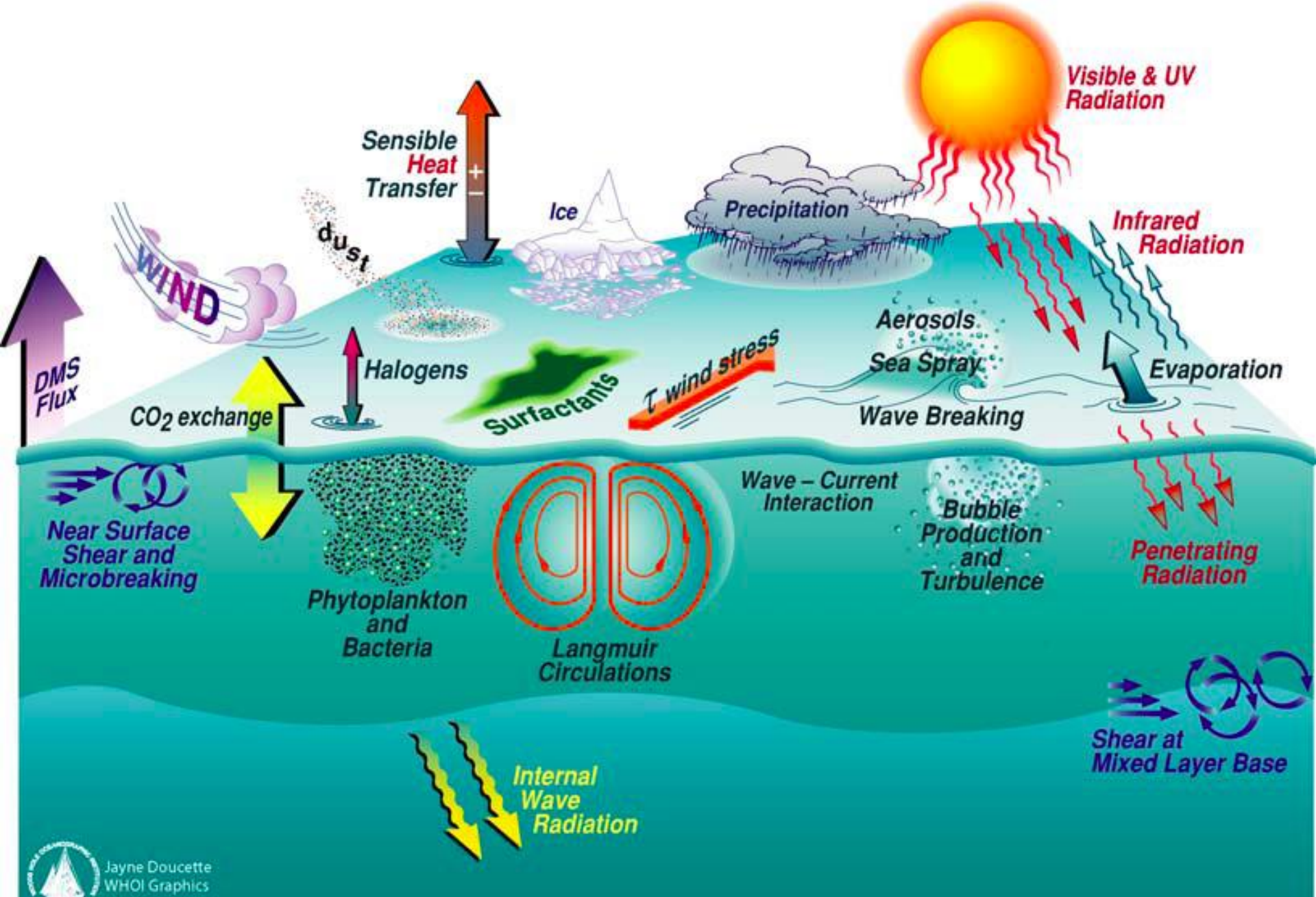
Observational scheme
10 degree spacing
9 time/year

A Large-Scale CO_2 Observing Plan: In Situ Oceans and Atmosphere (LSCOP)



A Report of the In Situ Large-Scale CO_2 Observations Working Group

Component of observing system for climate and ecosystem change



Maintaining the CO_2 observing system

Discussion outline

Rationale/Justification

- Who are the user/ stake holders
- What are the overriding scientific goals
- What do we observe
- What products will be delivered
- How do we combine with other efforts

What is the current observing system?

- How do we maintain the current observing system
- How do we expand the system (what are the criteria)
- New technology
- Data delivery

A view of up- and down-scaling observations

$$F_{av} = (k\,\Delta C)_{av}$$

Two endmembers in study

1. F = **(k)** Δ C [We know ΔC pretty well, the uncertainty lies in k]
   -smaller scale (experimental)
2. F = k **(ΔC)** [We know k pretty well, the uncertainty lies in ΔC]]
   -large scale (monitoring)

k = f(ΔT, wind, bubbles, shear, turbulence, rain, surfactants) (mixing processes and mechanisms)

ΔC = f (ΔT, bubbles, surfactant, biology, rain)

On large scale: $F_{av} = (k\,\Delta C)_{av} \approx k_{av}\,\Delta C_{av}$

Bulk parameterizations not too bad

On Smaller Scale $F_{av} = (k\,\Delta C)_{av} \neq k_{av}\,\Delta C_{av}$

Will not work on smaller scale –

if we resolve ΔC on small scale we must know k on smaller scale!