

Deployment & measurement of SF₆ & ³He

John Stephens (³He + SF₆)

Phil Nightingale (SF₆)

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+

Some mapping help from

Roisin Walsh?

Cliff Law?

Objectives

Service

Create a patch

Track the patch

Find patch centre(?) prior to main sampling period

Research

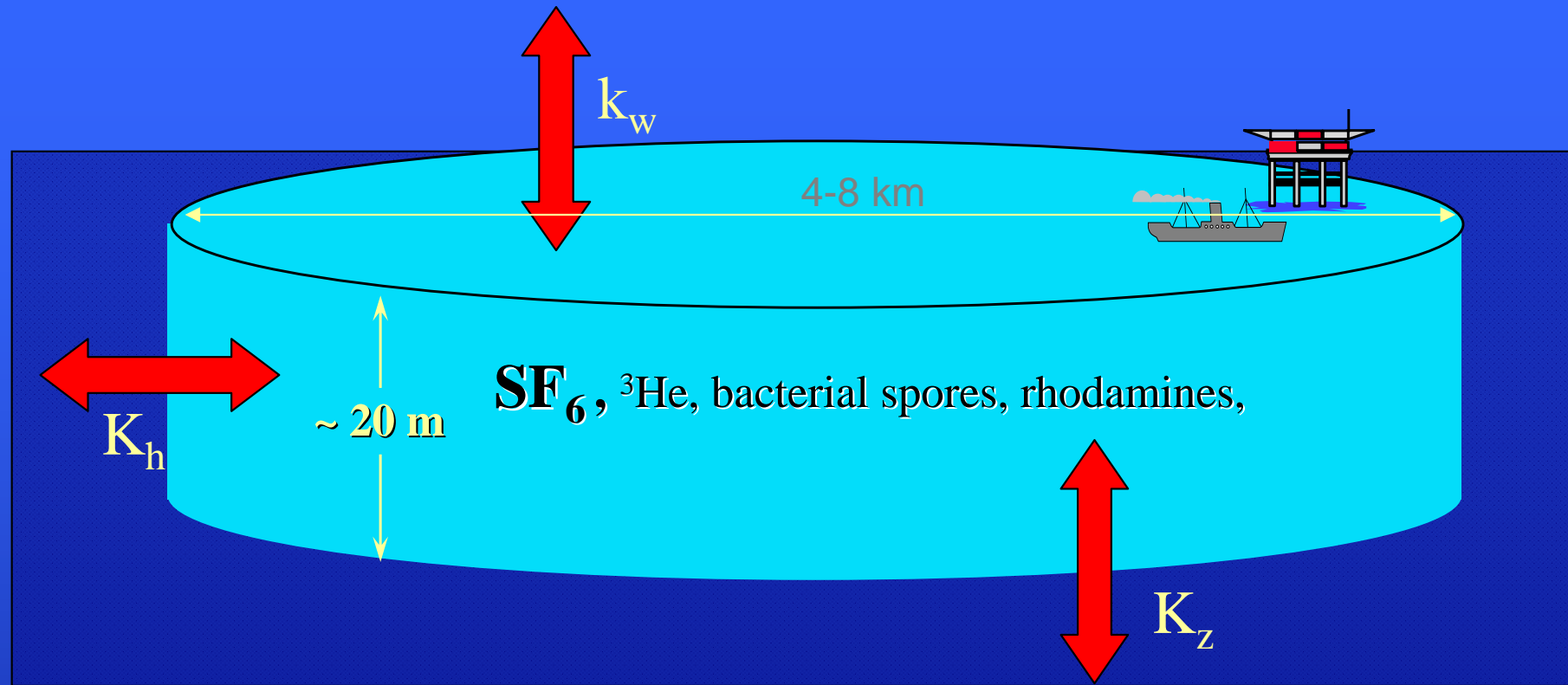
Estimate gas transfer (from change in $^3\text{He}/\text{SF}_6$ ratio)

Estimate vertical and horizontal diffusivity/mixing

DOGEE-SOLAS

Test role of surfactants in gas exchange (with NUT)?

DELIBERATE TRACER APPLICATIONS



Uses of deliberate tracers

- Tracking water body
- Lagrangian framework for time series measurement
- Proxy for iron or phosphate
- Biogeochemical budgeting

Constraining physical exchange pathways:

- Air-Sea exchange
- Lateral transport and mixing
- Vertical mixing

DEPLOYMENT



$^3\text{He} + \text{SF}_6$
(1 * 4m³ tank)

Contamination – please
keep away

Charging ~ 2 days

Release ~ 12-24 hrs
(size dependent)

Requirements

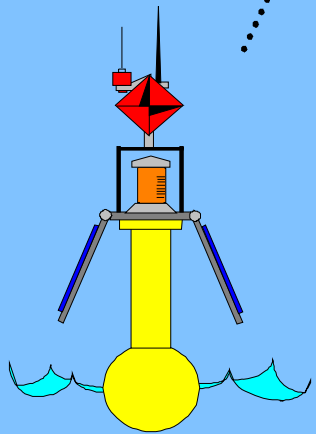
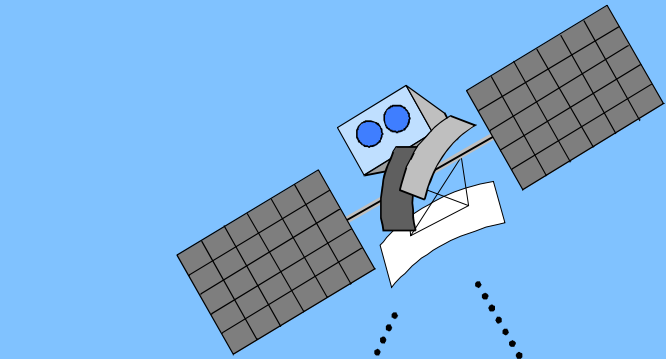
NT Water Supply

Shipping (separation of $^3\text{He} + \text{SF}_6$ + tank
from analytical equipment)

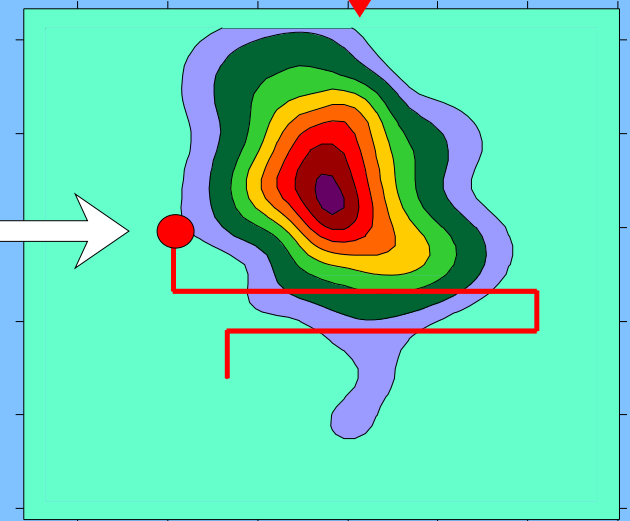
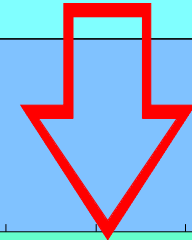
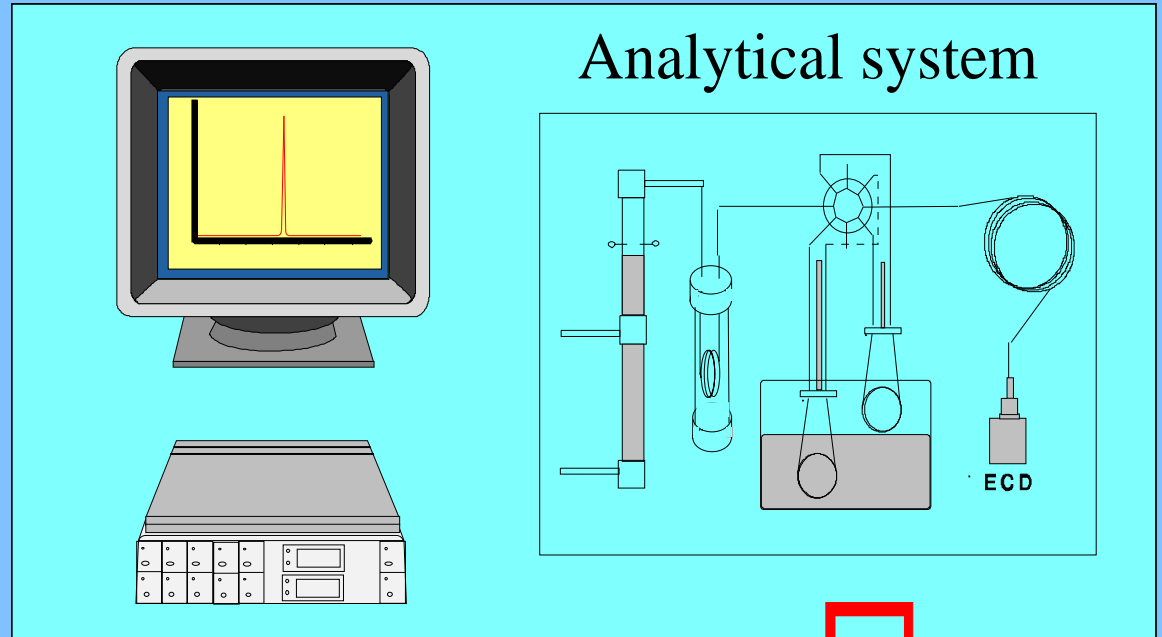
Space for pump & TCD-GC in container

Mapping: 8 hrs – 12 hrs (patch-size dependent)

May not be necessary every day



GPS Buoy
at Patch centre



SF6 Tracer Lagrangian Study Framework