

## SALINITY

### Chemical Oceanography

Study of the chemicals found in the ocean

#### Chemicals in seawater:

- Make life in the ocean possible
- Affect the way the ocean circulates
- Tell us how the ocean was in past times

**Dissolving power of water** => Every stable chemical element on Earth is in seawater

[Chemical Definitions](#)

[Glossary of Terms](#)

#### Chemical terms

- Elements - basic building block of chemistry, e.g. Na
- Compounds - combinations of elements, e.g. NaCl
- Ions - any element or compound with a charge, e.g. Na<sup>+</sup>
- Moles - atomic or molecular weight in grams, e.g. 1 mole H<sub>2</sub>O = (2 x 1) + (1 x 16) = 18 grams

#### Chemical composition of seawater

- Typical amount of salt in seawater is ~ 35 g/litre
- Major ions (6) make up 99.4 % of all dissolved chemicals
- **Marcet's Principle** - major ions uniformly mixed
- Minor and trace species lower concentrations -- non-uniform distribution, useful for tracing oceanic processes
- Why are some elements high concentration and well mixed and others low concentration and not?

#### Sources of chemicals to the Oceans

- Water flows indicate rivers most likely source
- Composition of river water very different from the ocean

#### Residence time of elements

- Average amount of time an element spends in the ocean before removal
- Range from < 50 yrs (Fe) to > 50 million yrs (Na)
- All major ions have residence time  $\geq$  1 million years
- Mixing time of the ocean