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FENFLUX: The short term climate response of CO_2, CH_4 and H_2O fluxes from a regenerating fen

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Peatland

Beautiful, unique ecosystem

Peat accumulate slowly by anoxic decomposition in waterlogged condition

Sedge (*Carex*); Reed (*Phragmites*); Peat moss (*Sphagnum*)

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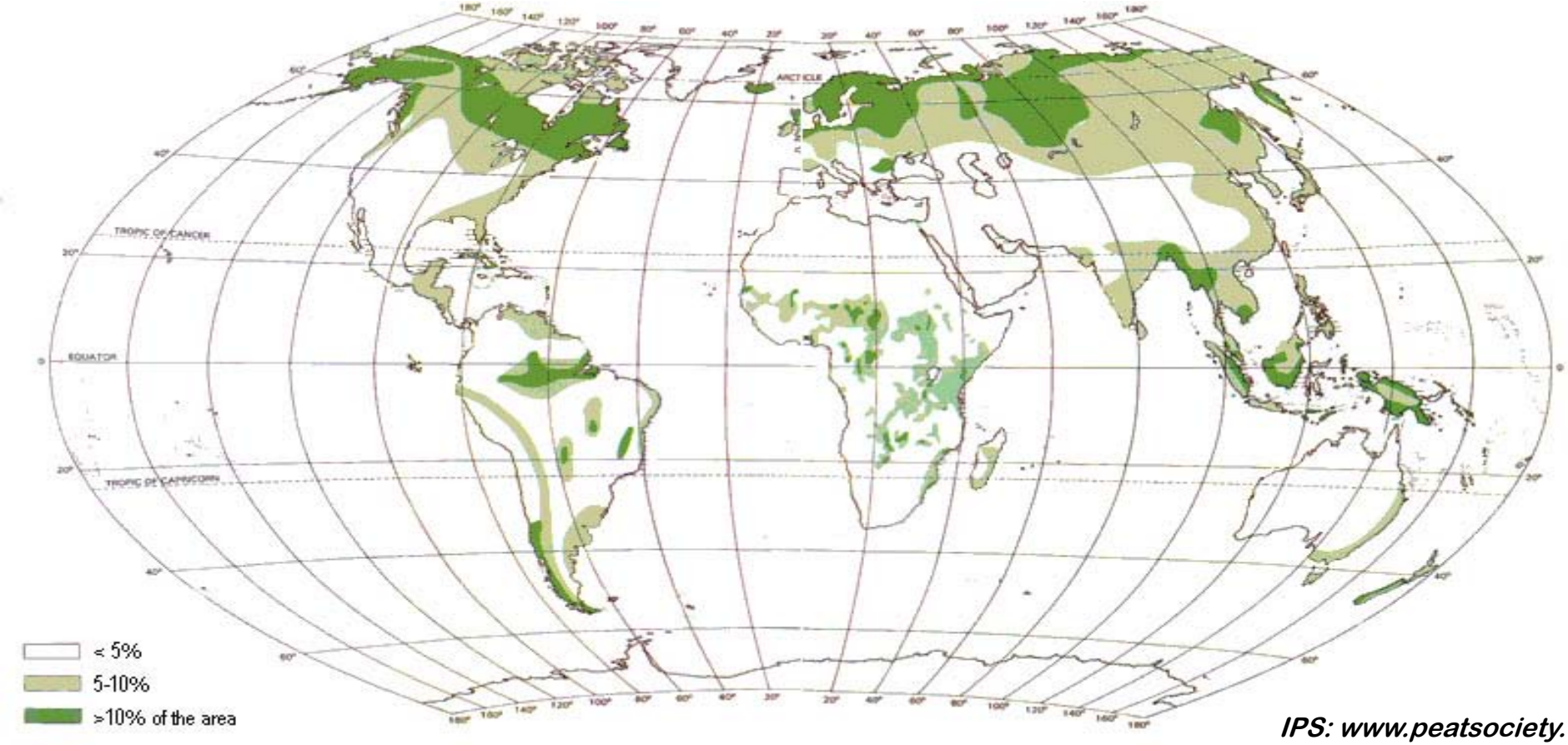
Global peat carbon store



IPS: www.peatsociety.fi

Peatland covers ca.400 million ha, = 3% Earth's land surface (*Strack et al. 2008*)

Theoretically, peatlands is a major store of soil carbon, the sink for CO_2 and source of atmospheric CH_4

- **ca. 30% of the world's soil carbon pool (*Turetsky 2001*),**
- **= half of carbon that in the atmosphere as CO_2 (*Dise 2008*)**
- **emit CH_4 ca. 20 million tones per year (*Strack et al. 2008)***

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Peatland

- low pH 3.5 – 4
- species-poor
- mineral-poor
- anoxic

Bog: ombrotrophic (rain-fed) peatland

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Peatland

Wicken fen, *wikipedia*

- high pH 4 – 8.5
- species-rich
- mineral-rich
- well aerated

Fen: minerotrophic peatland

- litter decays rapidly
- peat formation is weak
- plants can receive water pass through mineral soil (rich in calcium *etc.* cations)

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Peat

Ten facts about peat. *The telegraph*.

Peat "grow" 1 mm per year

9,000 years = 10 metre deep

Have been drained for agriculture, forestry, harvested for energy

- **Tropical peatlands:**
  120,000 km^2 to oil palm plantation
  (*Page et al. 2002*)
- **Non-tropical peatlands:**
  250,000 km^2 to agriculture
  150,000 km^2 to forestry
  50,000 km^2 to peat extraction
  (*Joosten and Clarke 2002*)

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Wicken fen

Backer's fen (regenerating fen)

- Has been drained
- Started to be rewetted

Sedge fen (semi-natrual fen)

Be harvested every four years

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Eddy covariance

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Eddy covariance

Air flow can be imagined as a horizontal flow of numerous rotating eddies
Each eddy have horizontal and vertical components

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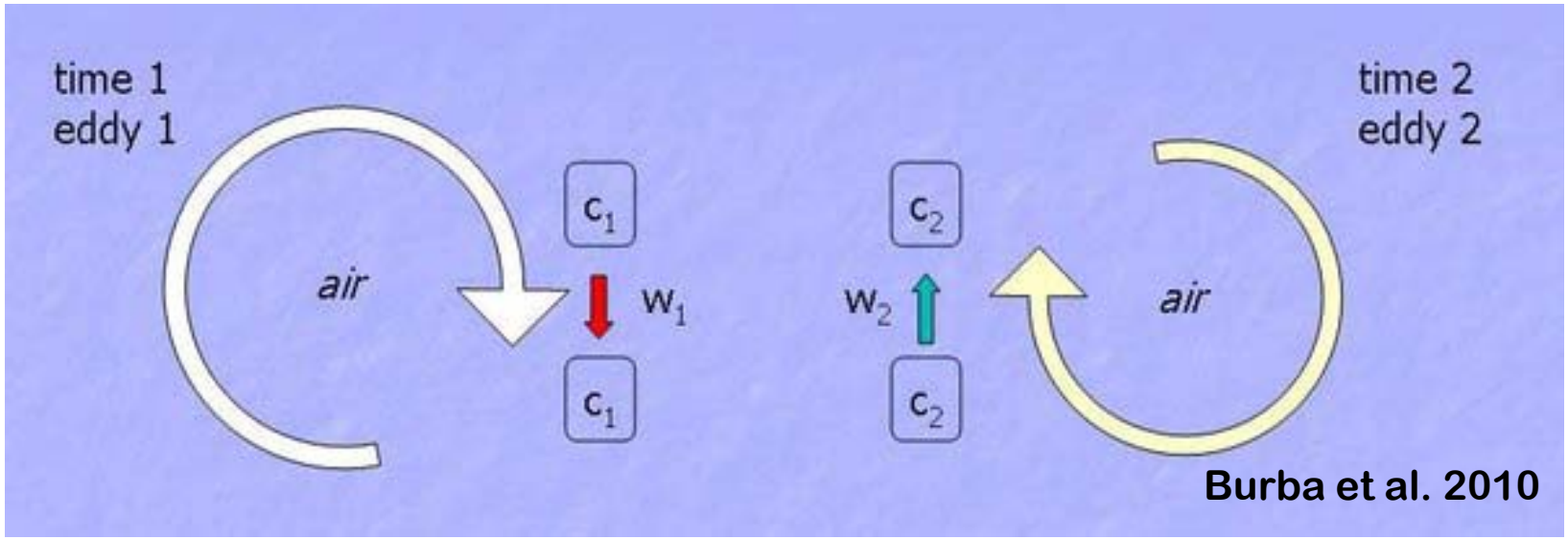
Eddy covariance



Vertical movement of the components can be measured from the tower

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Research questions

- Investigate whether regenerating fen (baker's) acts as CO_2 sink or source ?
- Whether semi-natural fen (sedge) acts as CO_2 sink or source?
- How about CH_4 emission on two sites?
- Investigate the magnitude of the impacts of restoration and their response to climate variability

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Time plan

	Year 1 Term 1	Year 1 Term 2	Year 2 Term 1	Year 2 Term 2	Year 3 Term 1	Year 3 Term 2
Training						
Literature reading						
Data collecting						
Data analysis						
Thesis writing						
			VIVA			

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