

Regional Climate Modelling and IP3

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- regional climate modelling research not directly funded through IP3
- other programmes (IPY, A-BASE) funding 2 initiatives of interest to IP3

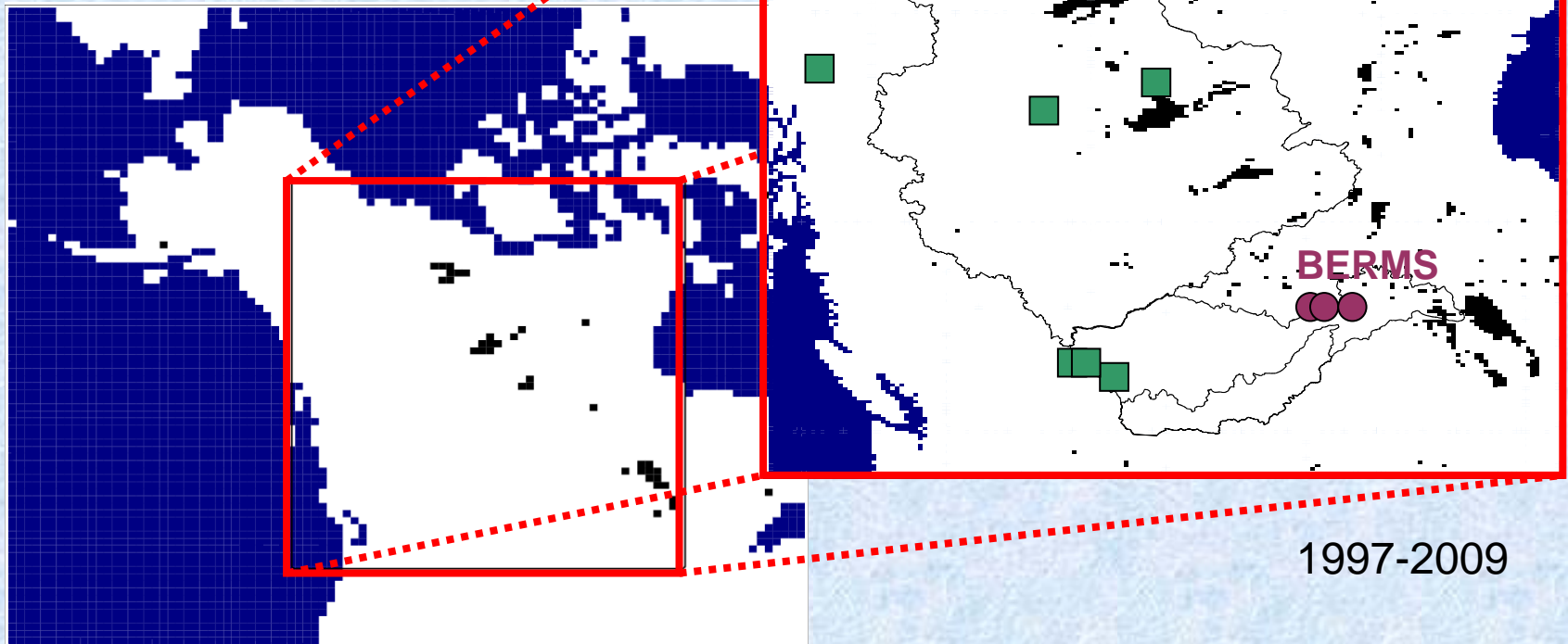
CRCM/CLASS3.3

50 km



- 10 year simulation (1997-2009)
driven by CMC analysis
- first major run of CRCM/CLASS3
("MAGS coupled model")

CRCM/CLASS3.3



- this simulation downscaled onto 15km grid
- applications being developed on both these grids including
WEBS study for DRI
regional lake study

CRCM/CLASS2.7

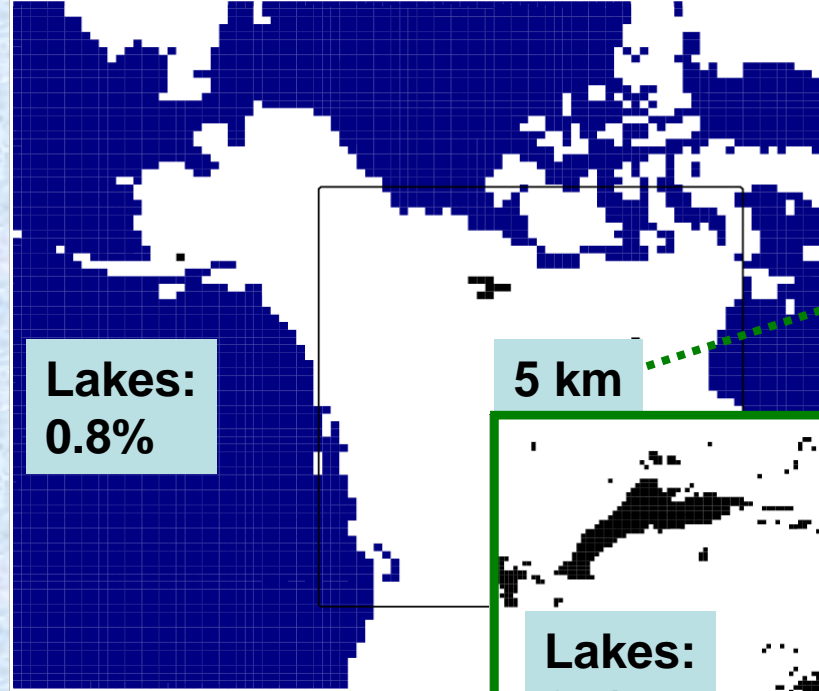
50 km



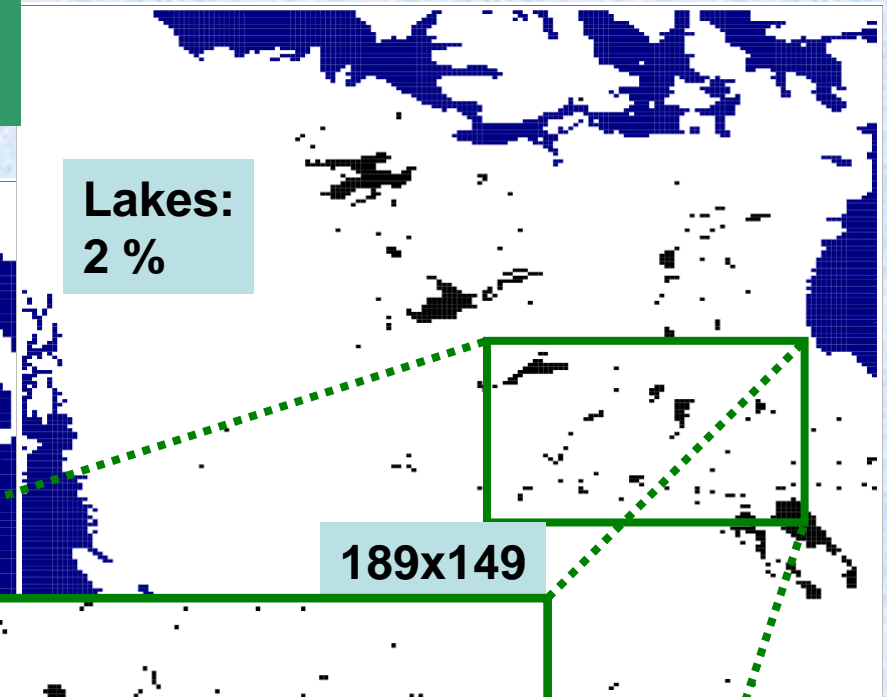
- 100 climate run (1960-2060)
- driven by CGCM3
- can be downscaled to region/period of interest using CRCM/CLASS3.3

Canadian Regional Climate Model Experiments

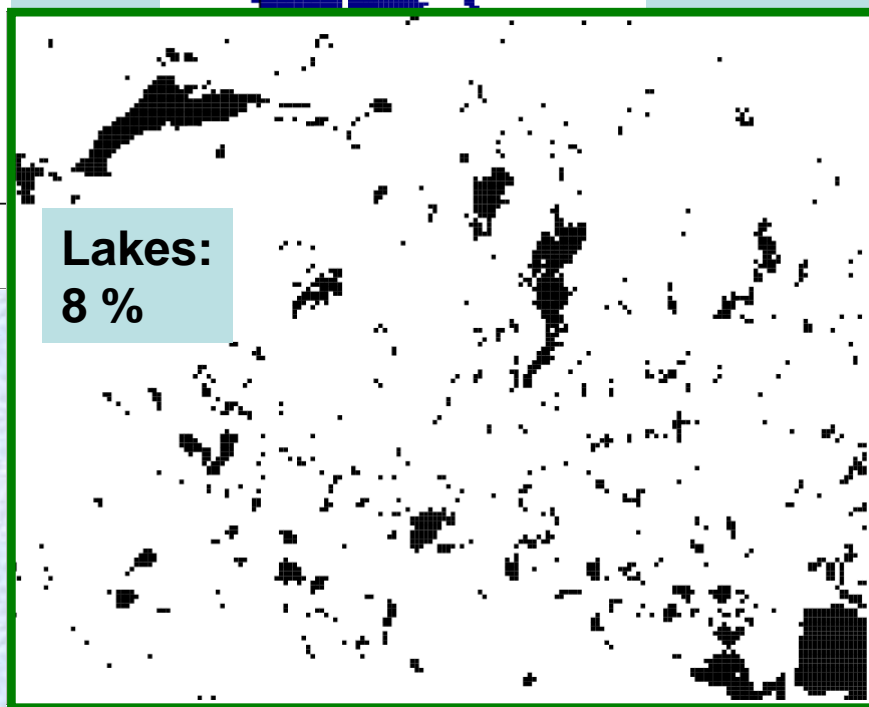
51 km



15 km



5 km

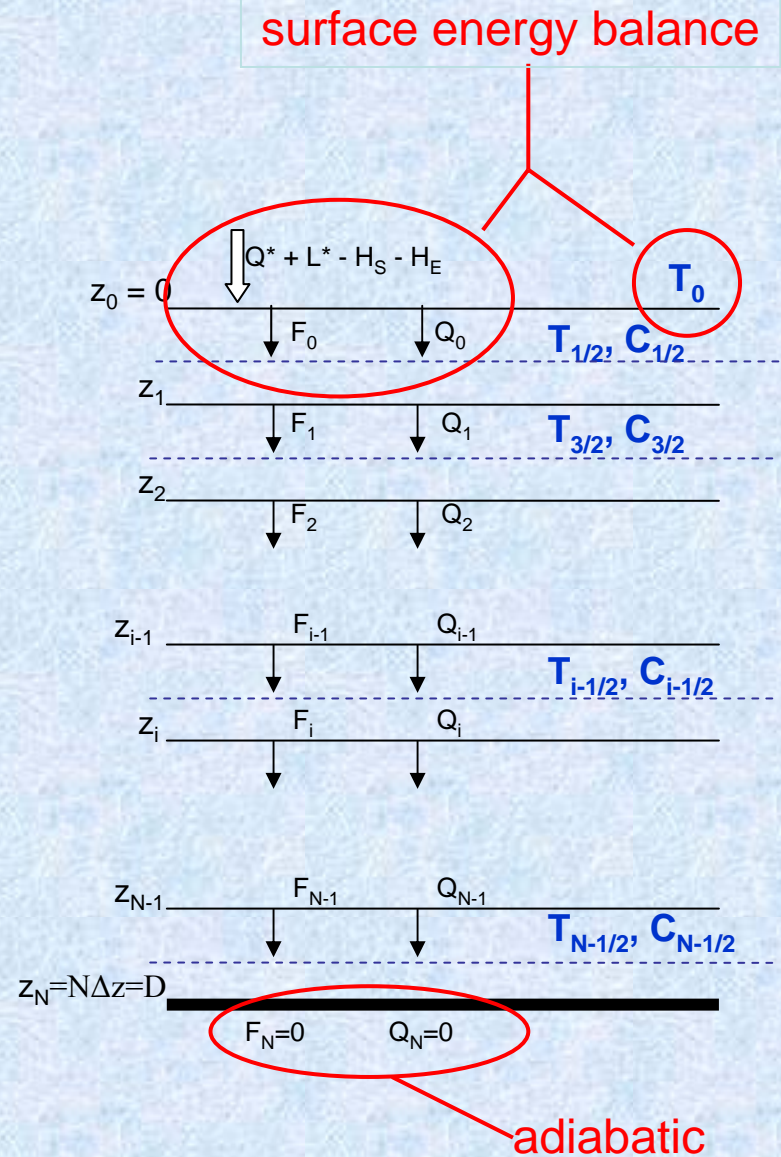


LAKE1D – Thermal Model

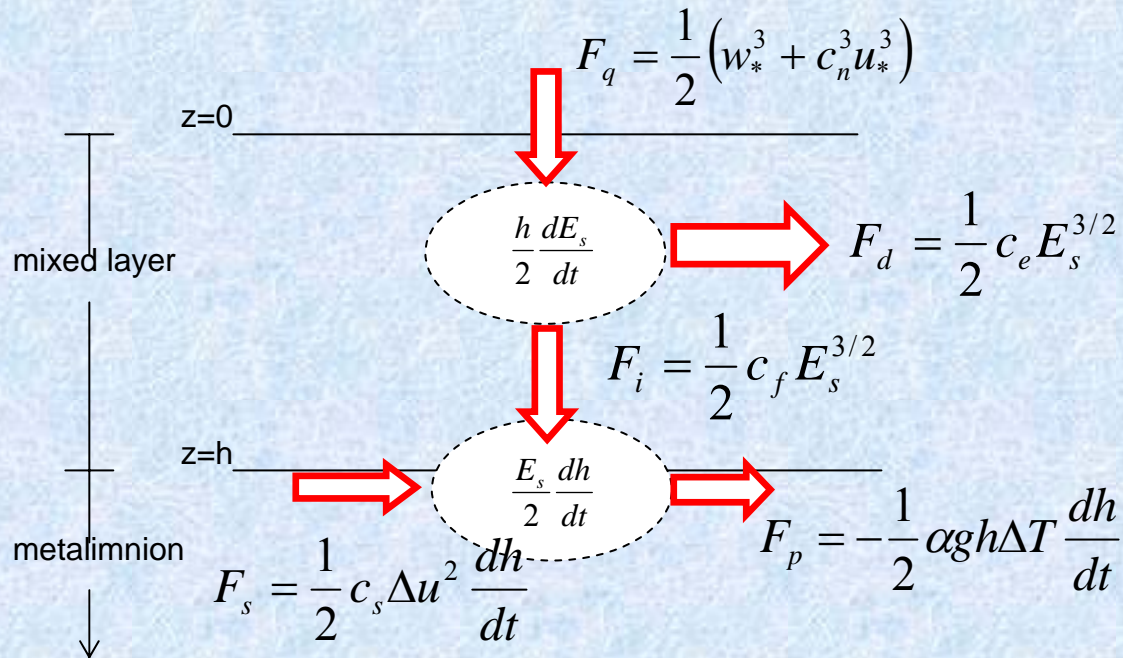
$$\frac{\partial T}{\partial t} = - \left(\frac{1}{\rho c_w} \right) \frac{\partial F}{\partial z} - \left(\frac{1}{\rho c_w} \right) \frac{\partial Q}{\partial z}$$

$$F(z) = -K \frac{\partial T}{\partial z}$$

$$Q(z) = Q^* \left\{ \sum_{i=1}^3 a_i \exp(-b_i z) \right\}$$



LAKE1D – Turbulence Model



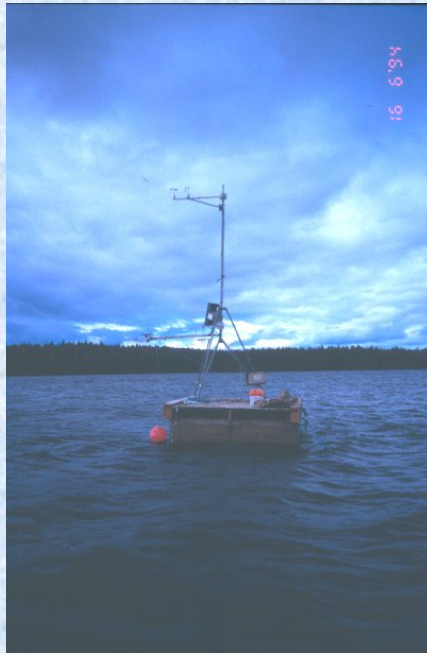
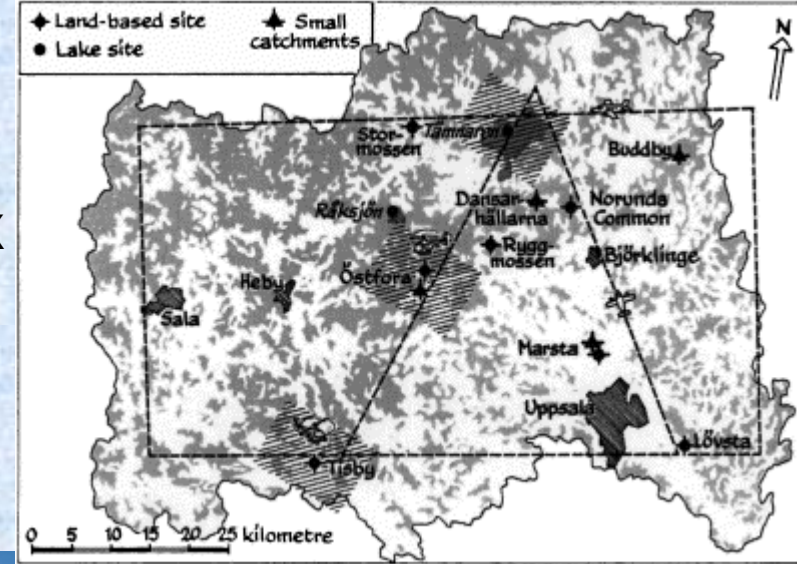
$$\frac{h}{2} \frac{dE_s}{dt} = F_q - F_d - F_i$$

$$\frac{E_s}{2} \frac{dh}{dt} = F_i + F_s - F_p$$

Rayner's (1980) *closure hypothesis*

LAKE1D – Simulations

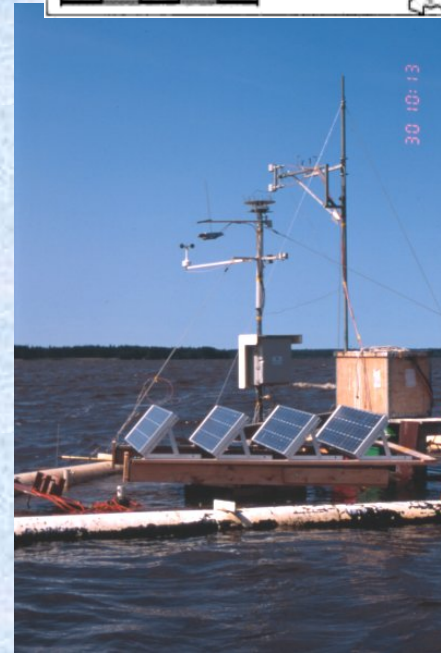
- Meteorological and limnological data from NOPEX
(Northern Hemisphere Climate-Processes Land-Surface Experiment)

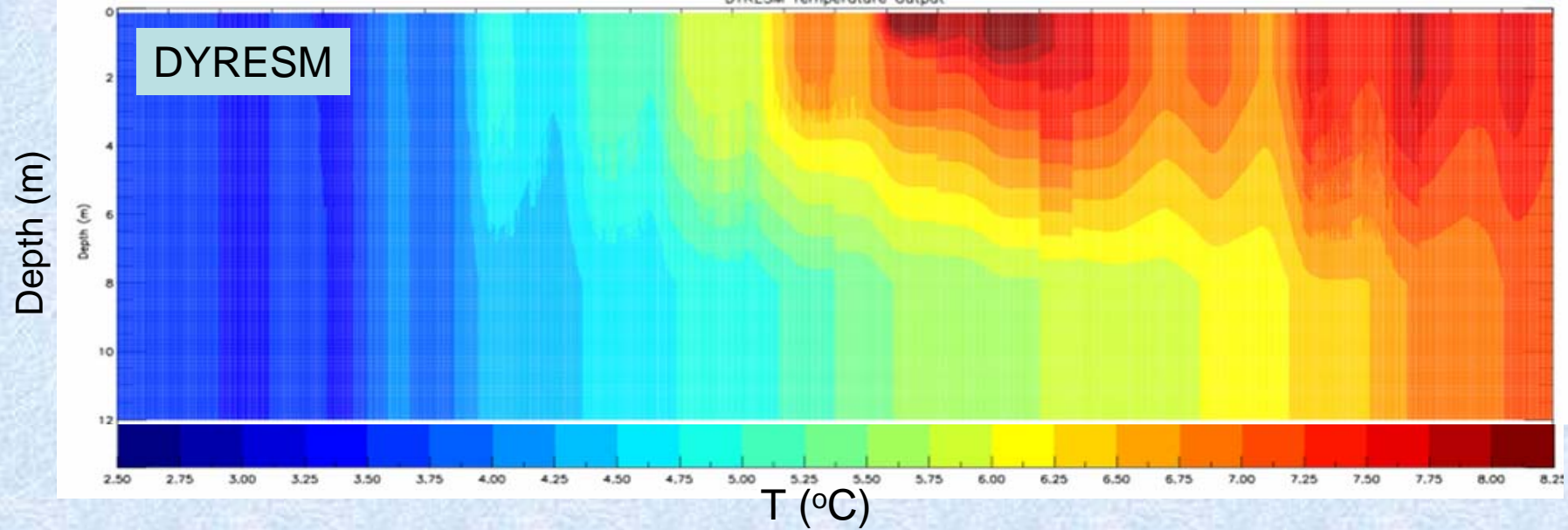
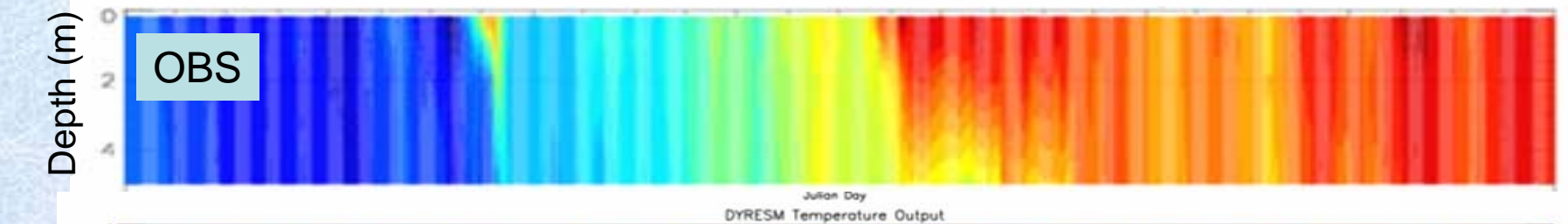
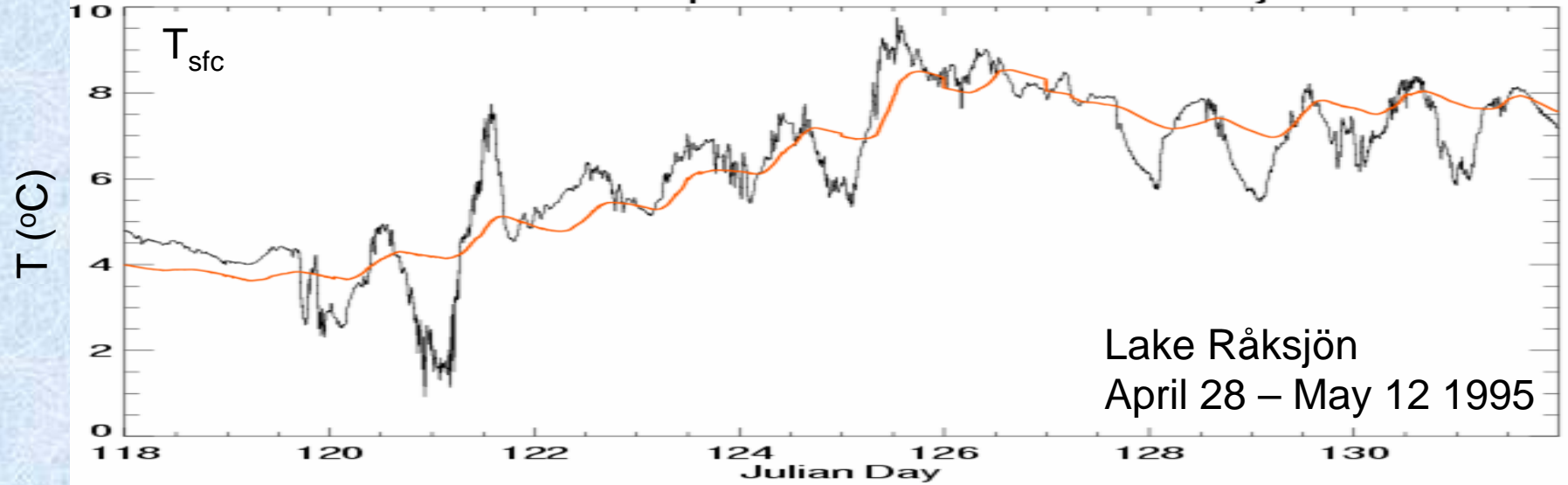


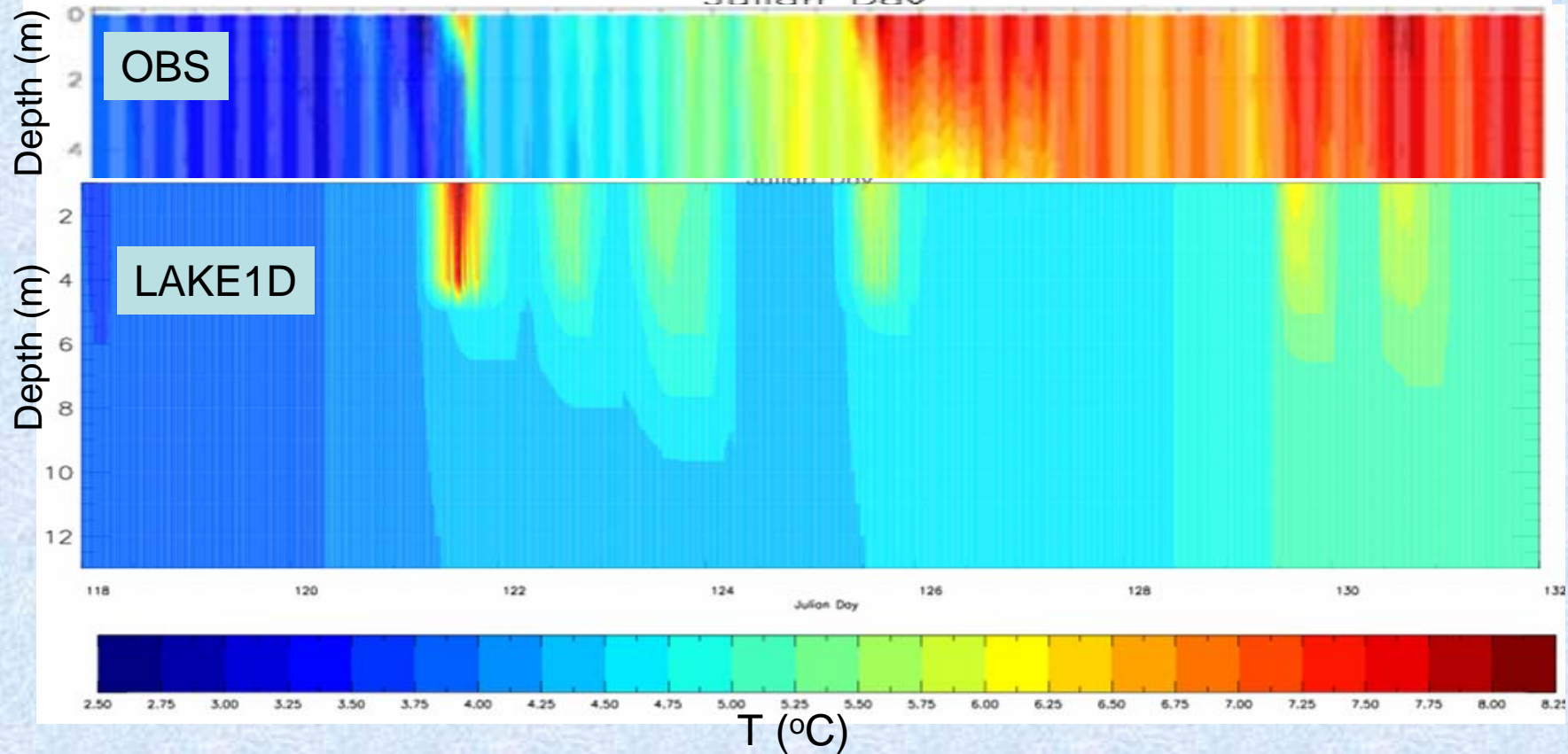
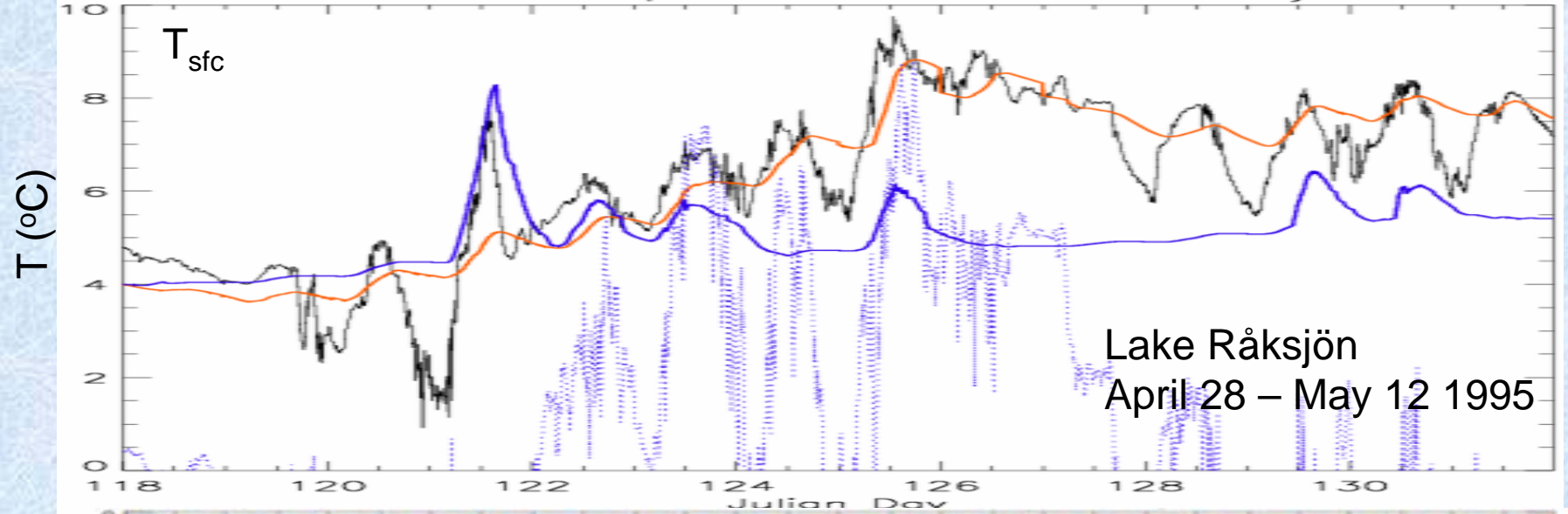
Lake Råksjön



Lake Tämnaaren







SUMMARY

There are 2 types of RCM activity that may be of interest to IP3

- 10 year current climate (realistic forcing)
best for *process studies* (e.g. lakes)
- 100 year recent+near future climate with GCM forcing
required for *scenario studies*