CLIMATE, OCEAN AND SEA ICE MODELING PROGRAM

Melt Ponds in CICE

Elizabeth Hunke

March 1, 2011

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   includes melt ponds implicitly through reduced albedo
2. default pond description in the delta Eddington radiation scheme
3. the CCSM4 pond scheme
   submitted to CCSM4 special issue of *J. Climate*

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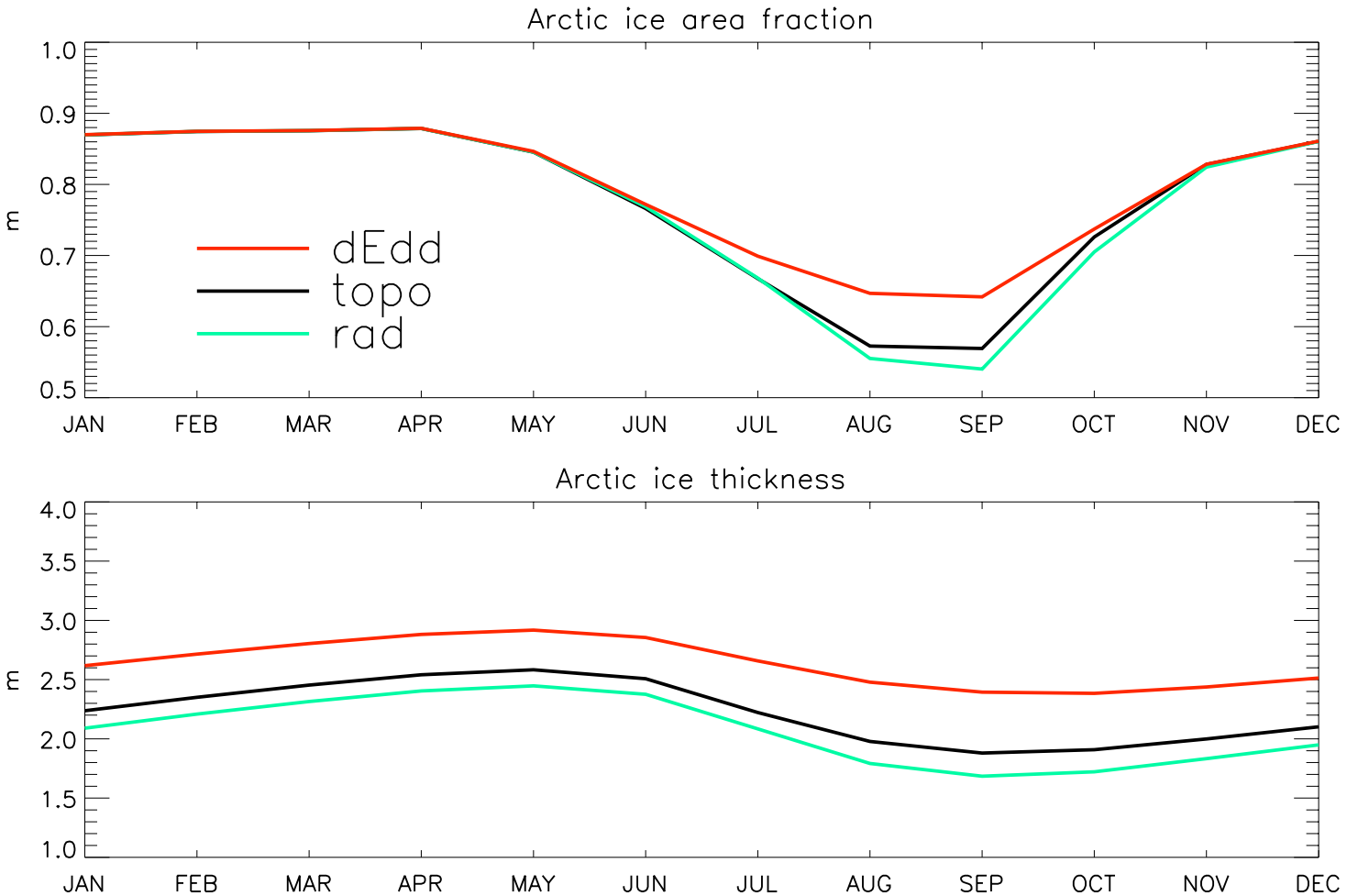
Seasonal cycle, 1980–2001, 72–90 N



TOPO Ponds

Major differences from Flocco et al. 2010:

- use delta-Eddington radiation scheme
- ice lid growth not added to ITD until $V_p = 0$
- retained melt water fraction
- reduction by ridging
- transport a_p
- transport V_p and V_{ip} *on each category*

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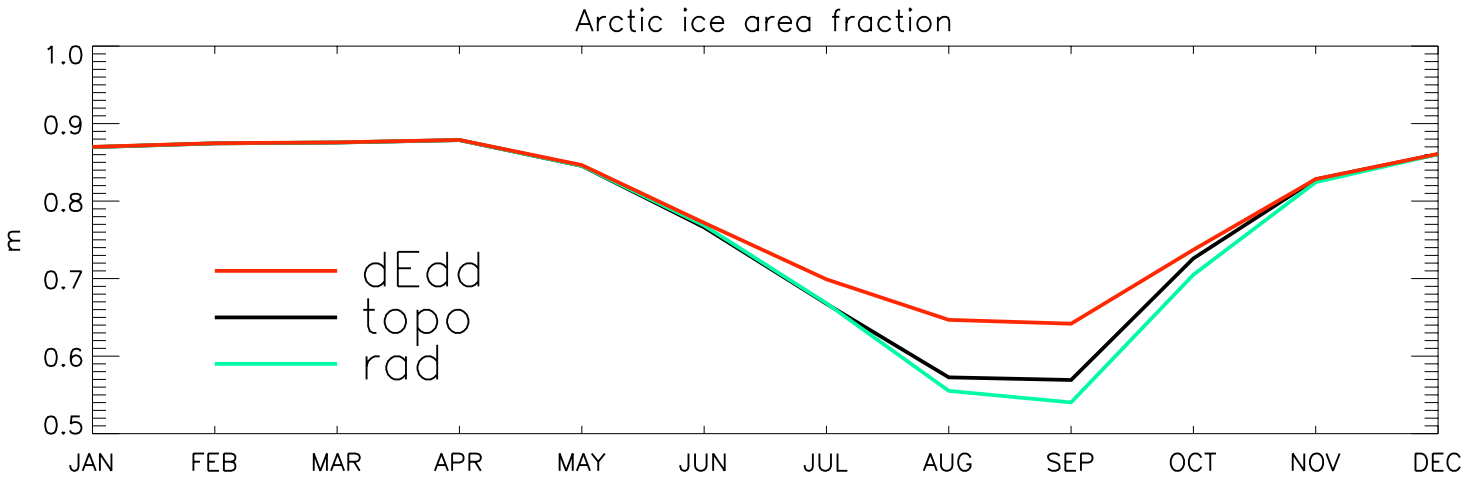

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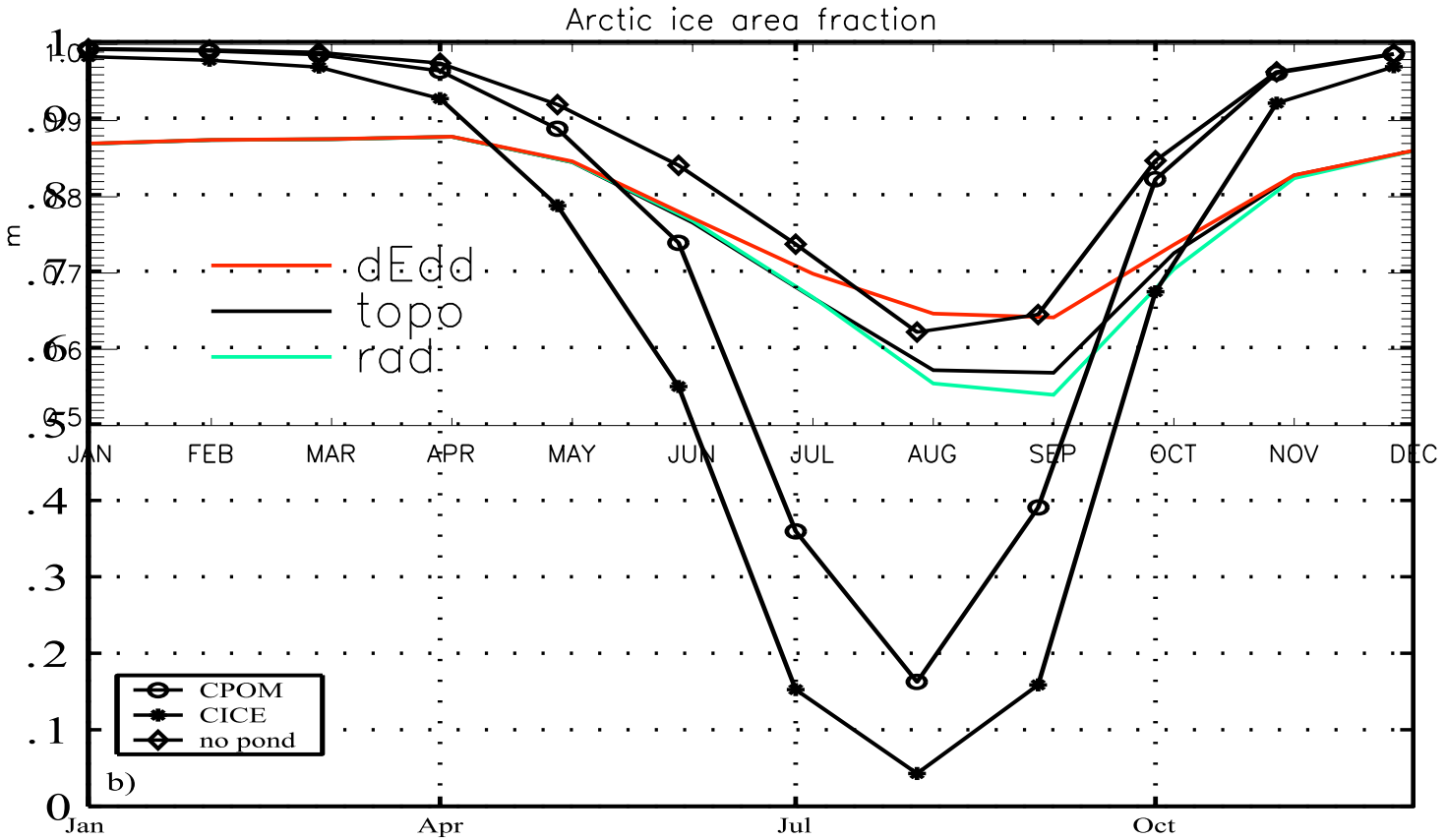
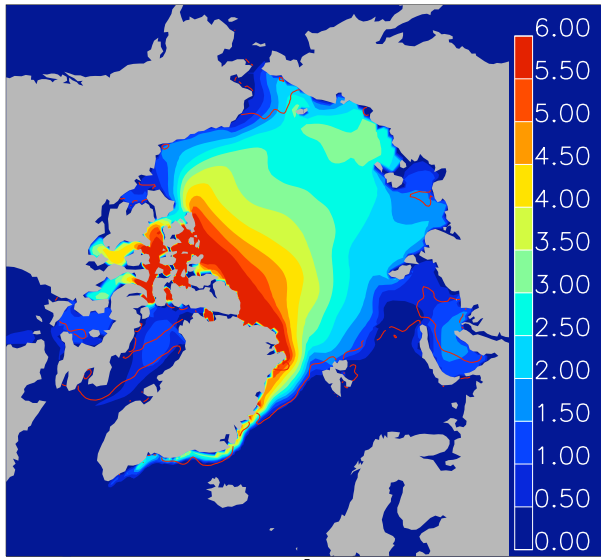
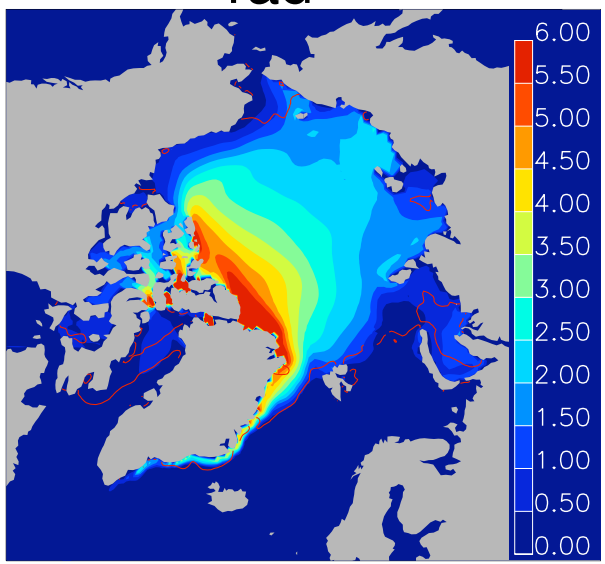


Sea ice thickness, July 1980–2001

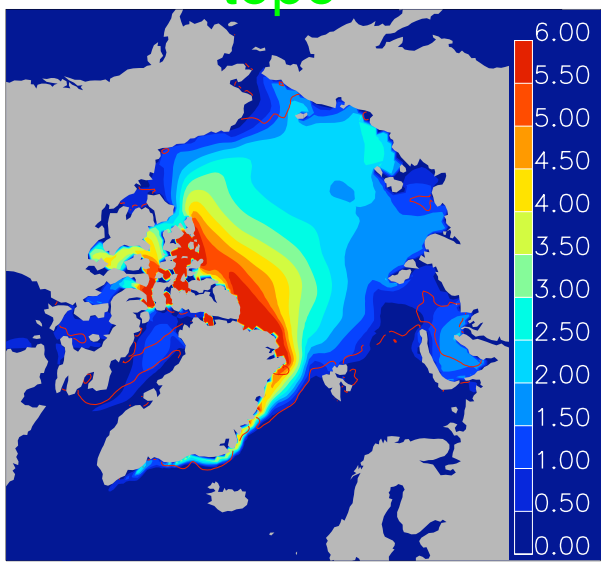
dEdd



rad



topo



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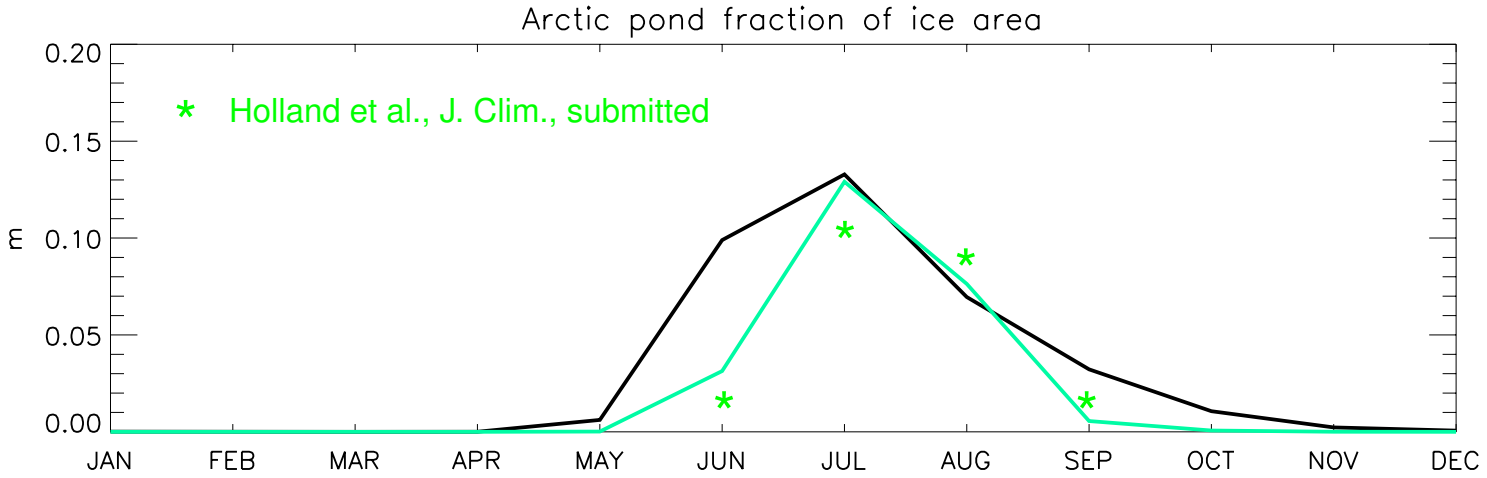
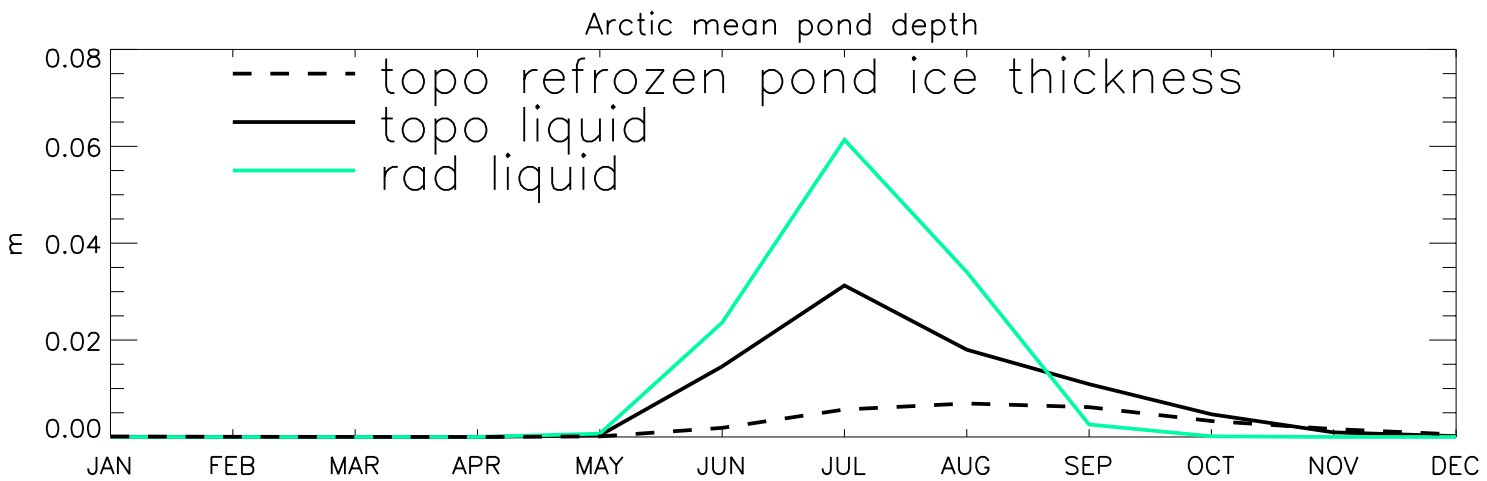
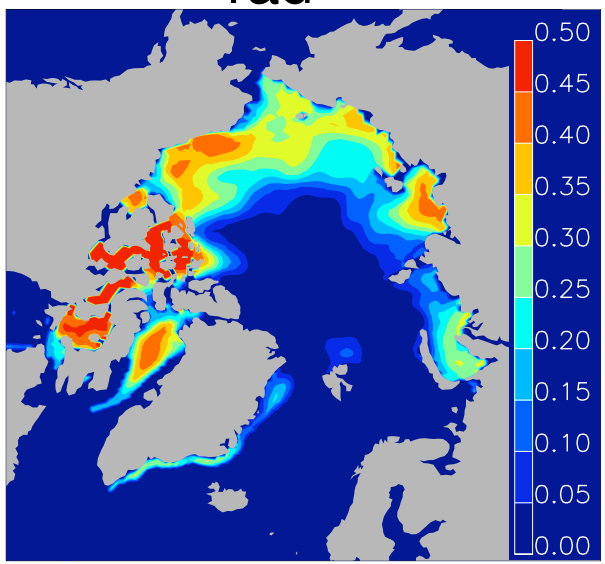




Pond fraction of ice area, July 1980–2001

rad



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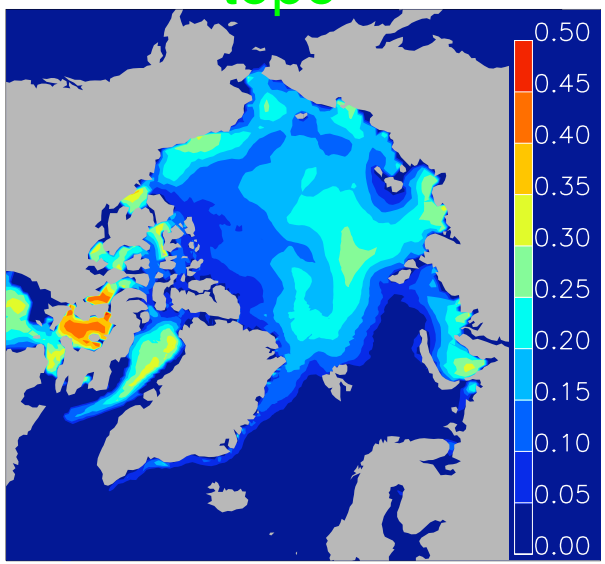
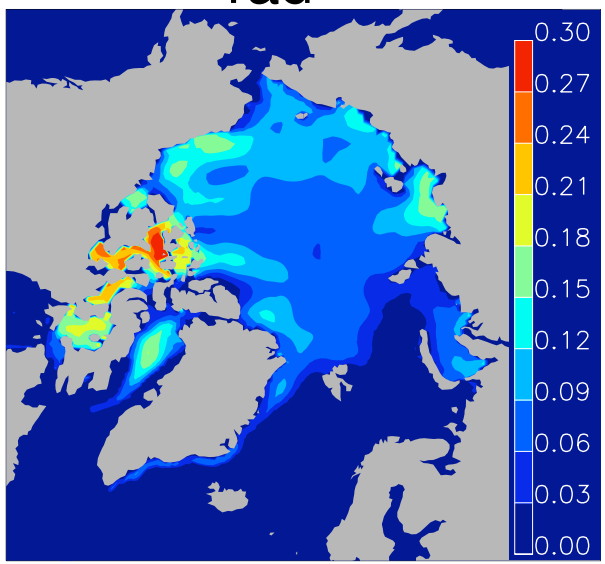


Pond depth, July 1980–2001

rad



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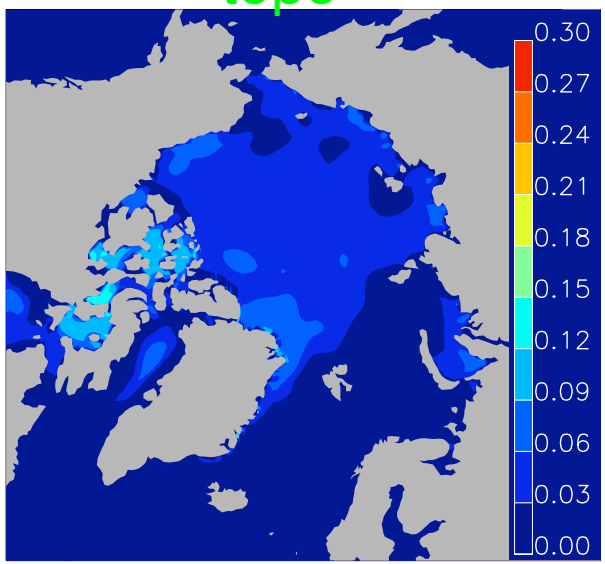

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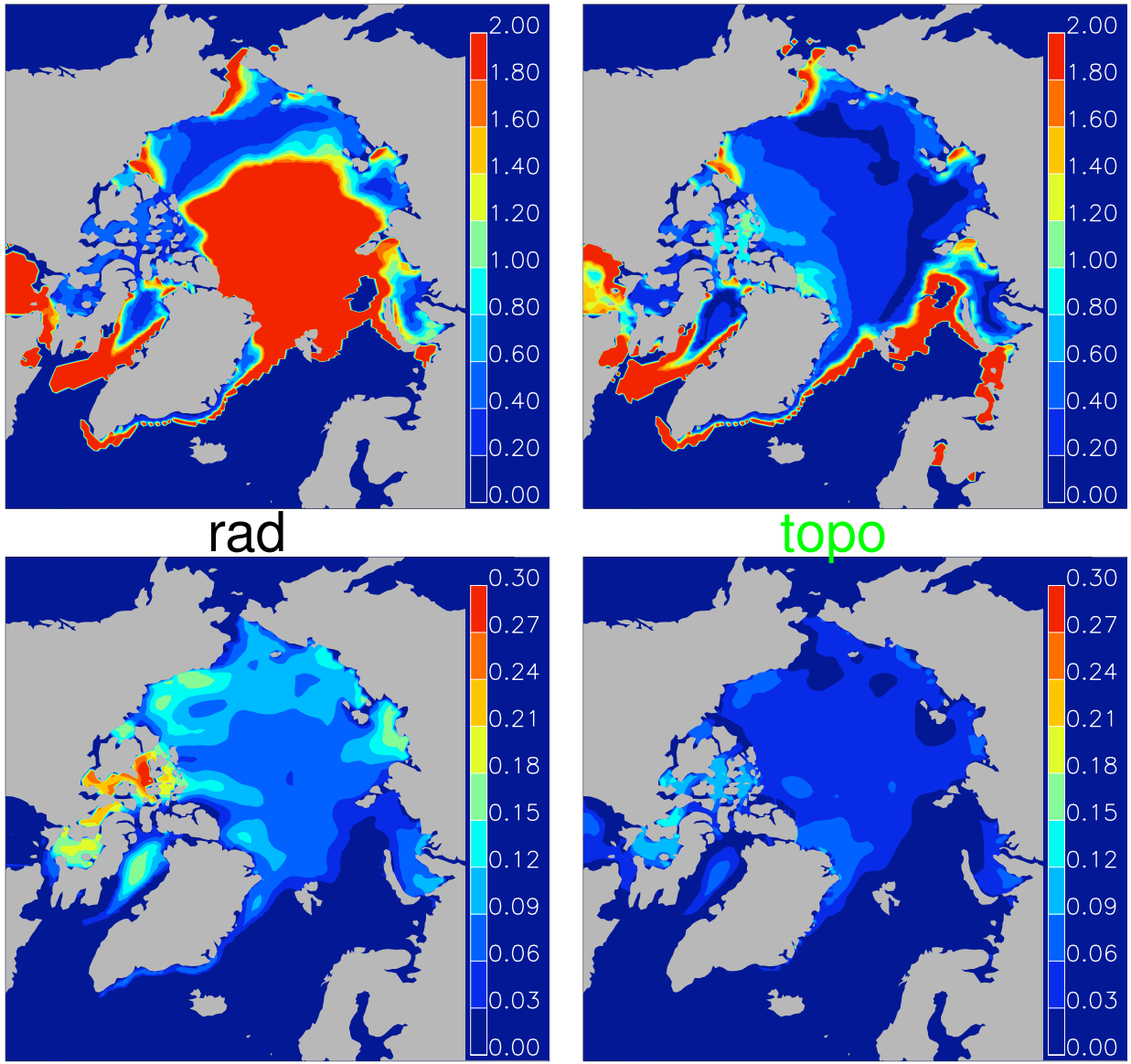
h_p/a_p



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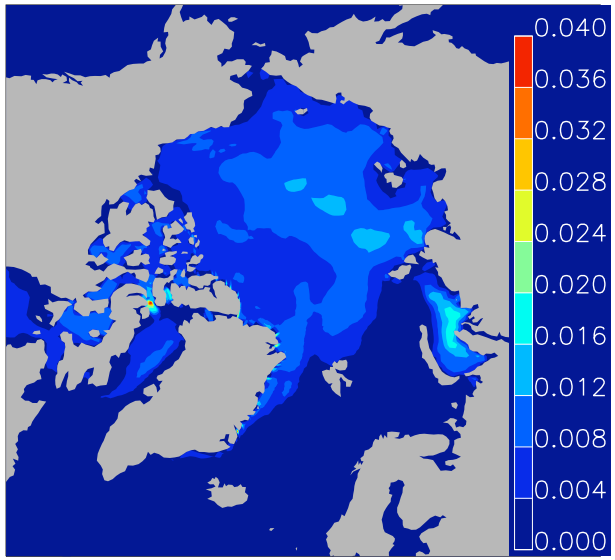
refrozen pond ice thickness



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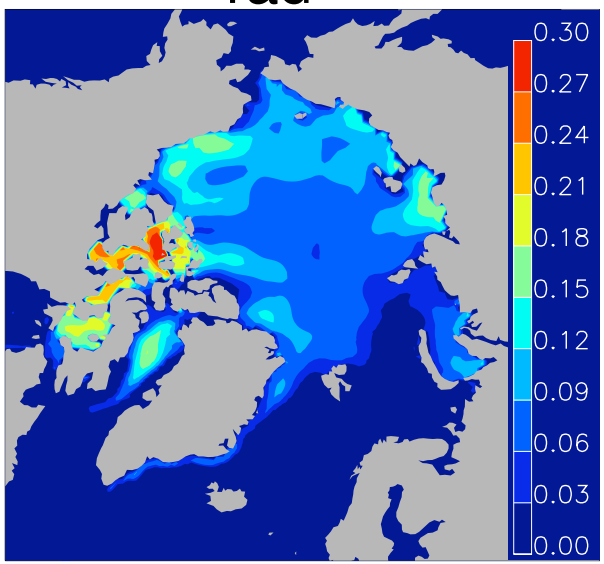

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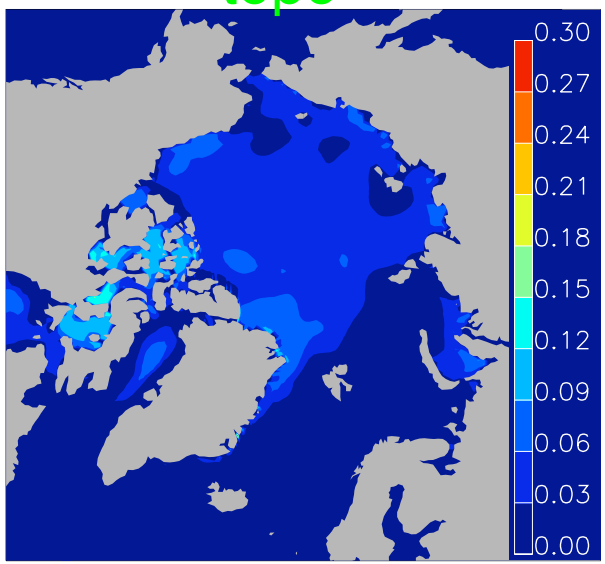

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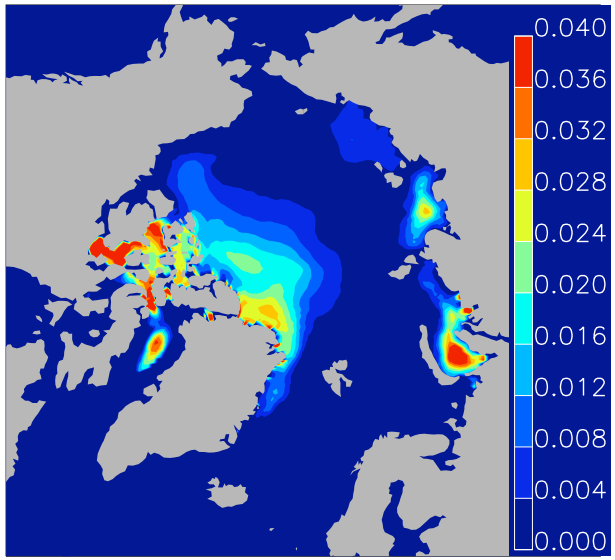

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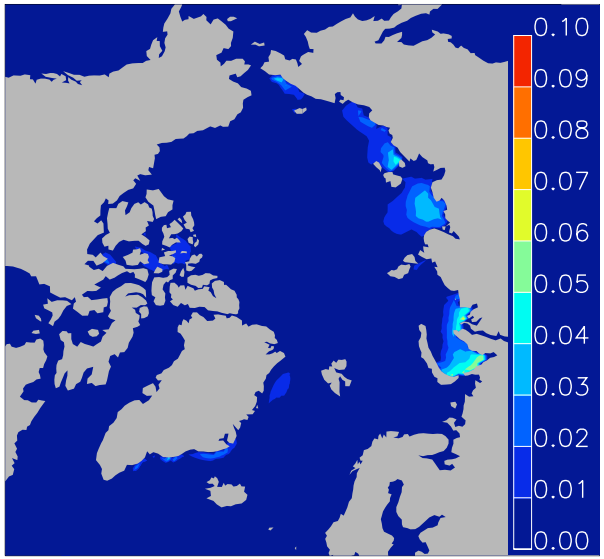

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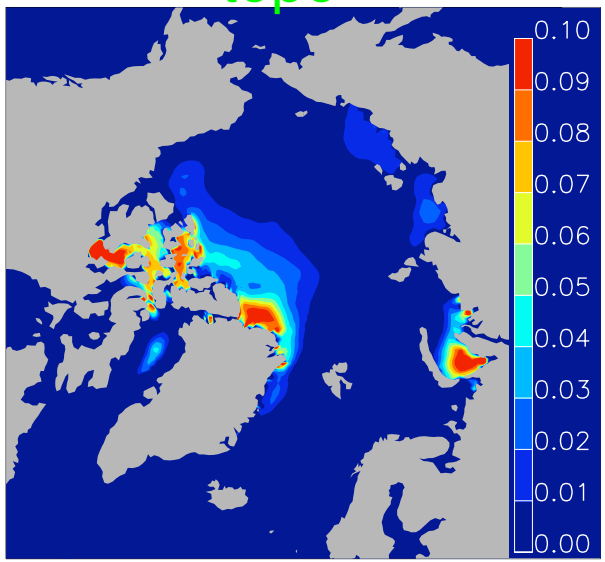

September 2007

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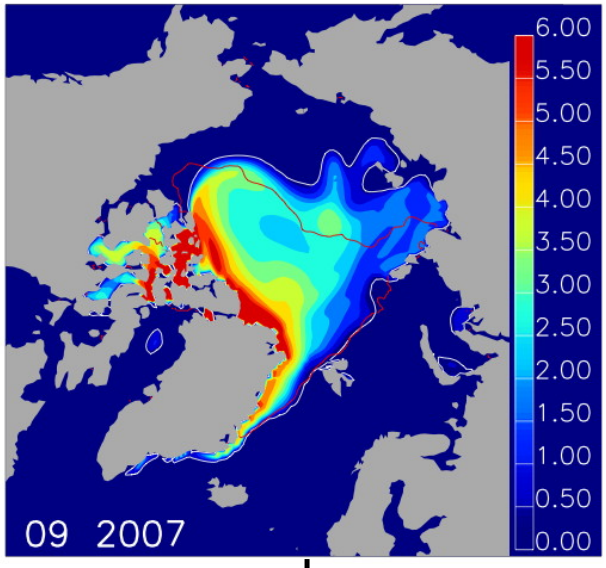
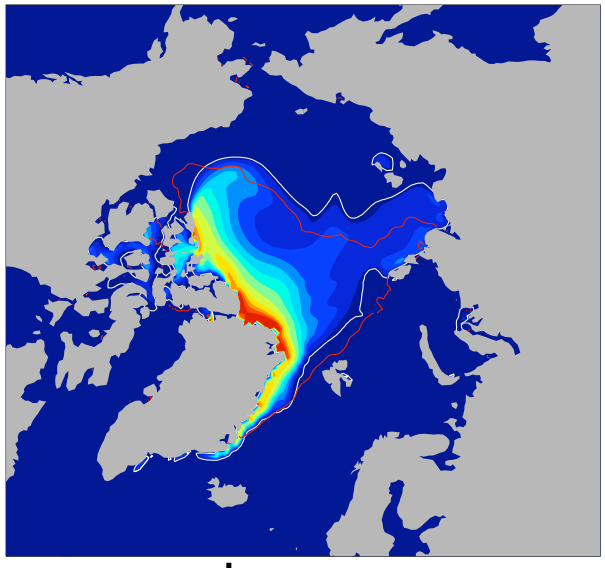


default



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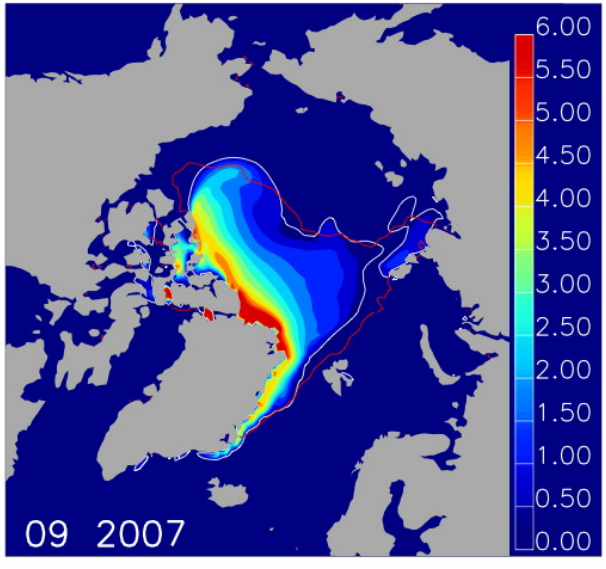

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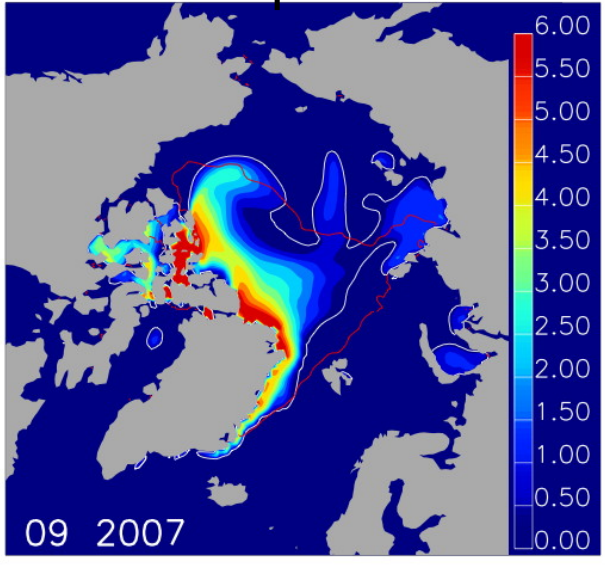

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	rad	topo
ponds	0.25%	0.43%
advection	13%	14%

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