**The Cryosphere
Discussions**

Interactive comment on "Interaction between ice sheet dynamics and subglacial lake circulation: a coupled modelling approach" *by* M. Thoma et al.

F. SAITO (Referee)

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This paper presents discussion on interaction between subglacial lakes and overlying ice sheet using a full Stokes ice sheet model coupled with a three-dimensional lake model. The configuration of ice-lake system in the present paper is idealized and limited, but the referee think it good start for this kind of study.

This paper is fairly well written; I think it acceptable with minor revision as follows.

You use the pressure-depended freezing point in terms of local ice thickness (section 2.2), which implies the hydrostatic equilibrium. I think the effect of the non-hydrostatic term for this point is negligible, but you might mention this.

Section 2.4 and figure 3. It is very hard to distingusih wheter the surface is flat or

inclined.

Section 2.4 (P811 L11). It is not so clear to me why accelerated ice at the surface first slows down and accelerate again. Better explanation may be expected.

Your lake model is on a spherical coordinate. I do not critisize it, but is there any strong reason to apply the spherical coordinate model, especially to couple with a Cartesian coordinate model (ice part)?

Very minor points P815/L17 'are are' should be 'are'

Figure 1 (a) Red (3/2) and blue (0/0) symbols are opposite in the legend.

Figure 3 (b) and others. The term 'Depth' for the vertical axis may not be correct (it seemed to me the distance from the surface).

Figure 5 There are no coordinate information along the figures (nor the direction)

Figure 7 (d) Almost all area is covered by red color. I think a better color scale helps to see the feature.

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