

## ***Interactive comment on “Development of a river ice jam by a combined heat loss and hydraulic model” by J. Eliasson and G. Orri Gröndal***

### **Anonymous Referee #1**

Received and published: 23 June 2008

Review Report Hessed-2008-0020 Development of a river ice jam by a combined heat loss and hydraulic model

COMMENTS This is an interesting exercise on applying static ice jam theory with ice volume estimated from heat loss calculations to model a freeze up ice jam. I do not think the word CFD used in the abstract is appropriate, since CFD is the term used for computational fluid mechanics while the authors’ work is actually a conventional steady state back water calculation. To use the term CFD is misleading. Also, the authors should be more careful in writing the paper by providing complete information. Ice jam modeling has progressed significantly beyond what the authors’ used. The authors should make reference to these more recent advances.

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Detailed comments:

p. 1026: The parameters used in the model such as  $k_1$ ,  $C_i$ ,  $n_c$ , etc. should be given.

p.1026: There are two variables  $\alpha$ ; and  $S_w$  used for slope of water surface. Why?

p. 1208, line after Eq. (8): The sentence "internal strength on the ice jam to balance hydraulic forces on it." is not accurate. The internal strength is balanced by water drag, gravity, and bank resistance.

p. 1208, line before Sec. 2.3. : The last word "dam"; should be "jam";. (Also, in the 1st paragraph of p.1031.)

p. 1208: 1st sentence of Sec. 2.3 is not correct, since  $h_m$  is not directly proportional to  $S_o$  according to Eq. 7.

Figure 4: This comparison with field data is not clear. The authors should show observed data in the figure. Also, the authors stated in the abstract "the results compare favorably to the HEC-RAS model";, but this comparison is not provided in the paper.

Figure 4: what are Series 3 and 4?

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 1021, 2008.

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