Solid Earth Discuss., 3, C26–C27, 2011
www.solid-earth-discuss.net/3/C26/2011/

Solid Earth Discussions

Interactive comment on "Optical method for measuring bed topography and flow depth in an experimental flume" *by* A. Limare et al.

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Received and published: 27 March 2011

Dear Dr Cochard, Thank you for your very interesting comments. We will modify the section 2.1 General considerations to clarify what seems to be unclear related to the moiré method definition. If usually the moiré method supposes the superposition of two or more periodic structures, in this work we used a cosine fringe pattern projection. Your comment related to the frequency of the projected pattern is very important: actually we think that one of the most significant advantages of the method we used in our work is the fact that there is no need for the frequency to be constant. This requirement is essential when using the Fast Fourier Method as proposed by Takeda et al 1982. The algorithm proposed by Breque et al is based on a phase shifting method for phase calculation and a calibration procedure that uses a rotating plane at two po-

sitions separated by a given angle. The relief of the rotating plane is known in every point. The two phase fields obtained for the two positions of the plane are interpolated by a least square fit considering some (40) different lines distributed into the image according to the method given in Brèque et al. 2000. The Liebling method seems indeed very interesting. We ordered the book of Ghiglia et al., unknown to us up to now. We will modify Section 2.4 to better explain the unwrapping method used. This method is based on a modified Bone 1991 algorithm (Brèque et al 2004, already cited in the submitted paper). The discontinuities are detected from the second derivative of the phase field: there is discontinuity if one of the three second derivatives is greater that a threshold value (that depends on the image, but is less that 2π, usually 5 rad). We believe that the free surface of water is parallel since the flow is laminar and the slope is low with no steep variations. This was verified in the work of Malverti et al. 2008, already cited in the submitted paper. Water velocities obtained experimentally compared rigorously with predicted values from laminar flow Navier-Stokes equations. On behalf of all authors, Sincerely A. Limare

C Breque; F J Bremand; JC Dupre (2000) Characterization of biological materials by means of optical methods of measurement (Proceedings Paper), Second International Conference on Experimental Mechanics, Fook S. Chau; Chenggen Quan, Editors, pp.463-468 DJ Bone Fourier fringe analysis: the two-dimensional phase unwrapping problem. (1991) Appl.Opt 30, 3627-3632

Interactive comment on Solid Earth Discuss., 3, 187, 2011.