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Stereo photography for ocean wave measurements without sea control points

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A novel stereo photography method is developed for ocean wave measurement, and the mathematical model and algorithm are also developed. A new exterior calibration technique is built by the least square method in combination with the sea wave theory. Compared with the conventional calibration technique, the sea control points are not still needed. Thus, this novel stereo photography method can easily be extended to measurement sea waves on a moving platform. The laboratory experiments show that the stereo photography system proposed by us is accurate and can be used to measure gravity and capillary waves. Meanwhile, field experiments show that this method is available to measure ocean wind waves and swells.