Hydrodynamics under Large-Scale Waves Breaking over a Barred Beach - DTU Orbit
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This paper shows preliminary results of experiments obtained in a large-scale wave flume under monochromatic waves plunging over a fixed bar. Velocity measurements were conducted using acoustic and optical instruments at 22 cross-shore locations ranging from the final part of the shoaling zone up to the inner surf zone. The measurements included the bottom boundary layer and the lower part of the water column and provided insights on the mean velocity distribution, turbulent velocity fluctuations and Reynolds stresses. The mean velocity is generally seaward directed. Magnitudes of the mean velocity are small in the shoaling region and increase above the bar crest, especially in the higher part of the water column, while magnitudes in the boundary layer are relatively small. Fluid from the inner surf zone is transported offshore by the undertow and pushed up near the shoreward face of the bar, thus largely feeding the onshore mass transport above trough level. As a result a large recirculation cell located just above the trough of the bar is generated where currents and turbulent velocity fluctuations are strong.

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