



## Water motion relative to subtidal kelp fronds

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**ABSTRACT:** A study of water velocities near subtidal kelp fronds, relative to the motion of the kelp itself, is described. The dynamic model developed by Utter and Denny (1996) is used to develop a quantitative measure of the relative velocity vector,  $v_r$ . The numerical model is extended through the addition of a current, use of a larger drag coefficient, and explicit consideration of  $v_r$ . The model is tested by comparing it with microwave radar observations of a tethered float. The modeling of kelp frond motion uses parameters derived from current meter observations as input data. The results indicate that the relative velocity of seawater to the kelp frond is rarely zero and often is of comparable magnitude to the local Eulerian velocity of the water relative to the seabed. This has ramifications for modeling of both drag and boundary-layer transport processes. Use of a monochromatic wave field in the modeling in conjunction with examination of the results in the time domain suggests the magnitude of the current is very important in controlling motion at frequencies lower than the wave frequency.

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