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PIV measurements and flow characteristics downstream of mangrove root models. AMIRKHOSRO KAZEMI, OSCAR CURET, Ocean and Mechanical Engineering — Mangrove forests attracted attentions as a solution to protect coastal areas exposed to sea-level rising, frequent storms, and tsunamis. Mangrove forests found in tide-dominated flow regions are characterized by their massive and complex root systems, which play a prominent role in the structure of tidal flow currents. To understand the role of mangrove roots in flow structure, we modeled mangrove roots with rigid and flexible arrays of cylinders with different spacing between them as well as different configurations. In this work, we investigate the fluid dynamics downstream of the models using a 2-D time-resolved particle image velocimetry (PIV) and flow visualization. We carried out experiments for four different Reynolds number based on cylinder diameters ranges from 2200 to 12000. We present time-averaged and time-resolved flow parameters including velocity distribution, vorticity, streamline, Reynolds shear stress and turbulent kinetic energy. The results show that the flow structure has different vortex shedding downstream of the cylinders due to interactions of shear layers separating from cylinders surface. The spectral analysis of the measured velocity data is also performed to obtain Strouhal number of the unsteady flow in the cylinder wake.

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