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Computational Fluid Dynamics: from solar thermal receivers and collectors to sub-antarctic island wind simulation

Monday, 2 December 2019 13:50 (20 minutes)

The parallel cluster at the CHPC is used to provide speed-up on three fronts in the Computational Fluid Dynamics (CFD) simulations discussed. The first is for optimization of the parameterized geometry of a swirling jet impingement solar thermal receiver where many runs of fairly large Large Eddy Simulation CFD models are required. The second problem that benefits from the massively parallel approach, is that of a transient simulation of the atmospheric boundary layer turbulent flow field around a heliostat with a very small time step, requiring many time steps for a meaningful time series. This simulation is required to determine peak loads and perform the fluid-structure interaction of such a solar collector. The last type is for large models of wind flow over Marion island containing close to hundred million computational cells. These models are used to predict wind patterns that affect plant and bird life, especially as influenced by continued climate change.

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