PTRANSP Simulations of Sawtooth Oscillations in Tokamak Plasmas G. BATEMAN, F.D. HALPERN, A.H. KRITZ, A.Y. PANKIN, Lehigh U., R.V. BUDNY, D.C. MCCUNE, PPPL — Simulations with the PTRANSP predictive integrated modeling code are used to investigate sawtooth oscillations in tokamak plasmas. Components of the Porcelli model, the PORCELLI and KDSAW modules available in the NTCC Module Library http://w3.pppl.gov/NTCC, are implemented and used in the PTRANSP code to trigger sawtooth crashes and to reset plasma profiles within the sawtooth mixing radius duringr each sawtooth crash. The H-mode pedestal height is computed using the NTCC PEDESTAL module. Electron thermal, ion thermal, and momentum transport are computed using the GLF23 or the Multi-Mode anomalous transport models, together with neoclassical transport computed using the NCLASS model. The sawtooth model is calibrated by adjusting the magnetic reconnection fraction as well as coefficients in the model. This is accomplished by comparing the sawtooth period and amplitude with experimental data. The effects of sawtooth crashes on fast ion heating profiles, toroidal momentum profiles, as well as electron and ion temperature profiles are investigated. The calibrated simulation protocol is used to investigate the effect of sawtooth oscillations in ITER H-mode discharges.

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