PLANET FORMATION WITHIN THE GRAND TACK MODEL. S. A. Jacobson[1,2], A. Morbidelli[1], D. C. Rubie[2], K. Walsh[3], D. P. O'Brien[4], S. Raymond[5], [1]Observatoire de la Côte d'Azur, Laboratoire Lagrange, B.P. 4229, Nice Cedex 06304, France (seth.jacobson@oca.eu), [2]Universtät Bayreuth, Bayreuth, Germany, [3]Southwest Research Institute, Boulder, CO, USA, [4]Planetary Science Institute, Tucson, AZ, USA, [5]Universite Bordeaux, Floirac, France

We present conclusions from a large number of N-body simulations of terrestrial planet formation. We focus on results obtained from the recently proposed Grand Tack model, which couples the gas-driven migration of giant planets to the accretion of terrestrial planets. From these simulations, we find that Mars must be a stranded embryo in order for it to grow rapidly enough to match Hf-W constraints. We also show that the dynamical friction in the simulation, which is set in part by the amount of mass of the embryo population relative to the amount of mass of the planetesimal population, determines the timing of the last giant impact on Earth-like planets. Less dynamical friction results in a longer period of giant impacts. It also results in less mass accreted after the last giant impact, i.e. late accreted mass. This strong correlation between the late accreted mass and the time of the last giant impact is a new clock for dating the Moon-forming event. Lunar formation is associated with the last giant impact on the Earth due to the isoptic similarities of the two bodies. Highly siderophile elements and other considerations provide an estimate of the late accreted mass of 4.8 +/- 1.6 x 10^{-3} M_E (see talk by Alessandro Morbidelli), which is then used to predict a Moon-forming event time of 95 +/- 32 My. Even permitting a late accreted mass of 0.01 M_E, lunar formation cannot occur before 40 My without violating the relationship.