When considering a planetary liquid layer, precession is generally present, driving flows, hydrodynamic instabilities and perhaps dynamos. However, there is no systematic study of these flows in the spherical shell geometry relevant for planets, which makes difficult any extrapolation to planetary regimes. In this work, we consider a large number of magneto-hydrodynamic simulations of precessing spherical shells, where all the parameters have been systematically varied. We then use this large simulations database to study the forced basic flows, the associated instabilities, and the dynamo capability of these flows. For instance, we derive and validate an explicit analytical estimate of the viscous dissipation obtained in our simulations. We also propose theoretical onsets for instabilities in precessing spherical shells, showing that the parametric instabilities due to the outer boundary conical layer are controlling the stability in most cases. Finally, pioneering dynamo studies are extended to lower viscosities, showing that the asymptotic regime is not reached yet. The small-scale multipolar dynamos obtained in our simulations are mostly viscously controlled, which is unlikely to be relevant for planets. Finally, we apply our results to the Moon, showing that turbulence can be expected in its liquid core during its whole history.