Abstract. Motivated by the modelization of hysteresis observed in some materials, we consider a time-dependent nonlinear equation with coefficients that vary randomly on a small lengthscale. At the fine scale, the model exhibits a hysteretic behavior which persists under asymptotically slow loading. Using stochastic two-scale convergence as introduced by A. Bourgeat, A. Mikelic and S. Wright, ideas developed by A. Mielke and the fact that the fine scale model is convex, we identify its homogenized limit. This coarse model here writes as a corrector equation and a coarse equation, which are coupled one with each other. We also show that, at the coarse scale, the model again exhibits hysteretic behavior which persists under slow loading. Joint work with Thomas Hudson (Warwick) and Tony Lelièvre (ENPC).