

Figure S1: Sensitivity to diffusion scheme and time step Δt . Color scale indicates basin area. Basins are classified in seven area classes from 1 to 128 km^2 after 5 Myr of simulation. Basins with a confidence index lower than 50 % are discarded from the analysis. (a) Results with the implicit non-linear diffusion scheme. Δt is set to 1000 yr to ensure stability of the non-linear scheme (b) Results for the reference model. (c) Results for model using Δt equal to 1000 yr.

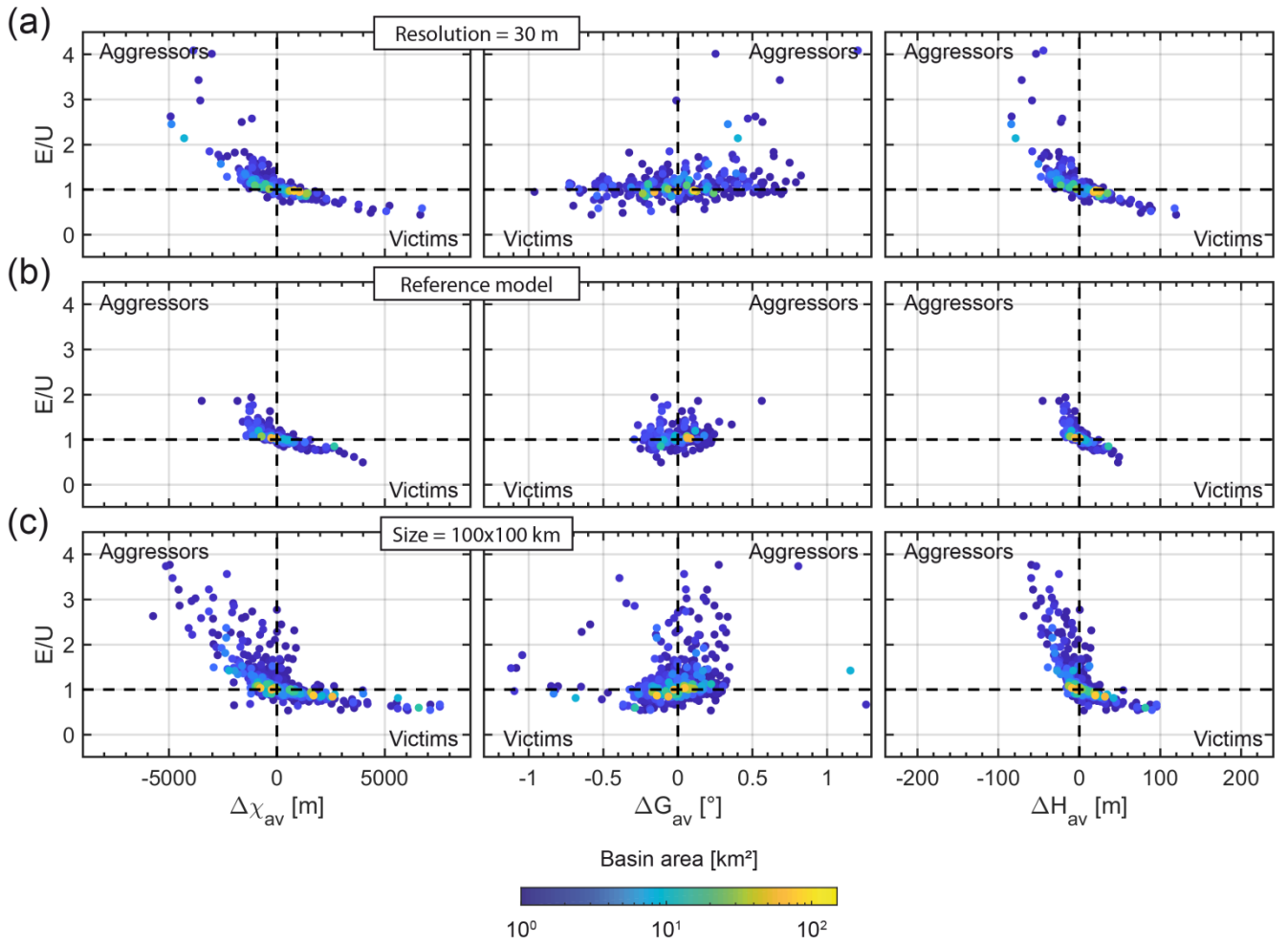


Figure S2: Sensitivity to grid resolution and model size. Color scale indicates basin area. Basins are classified in seven area classes from 1 to 128 km² after 5 Myr of simulation. Basins with a confidence index lower than 50 % are discarded from the analysis. (a) Results with a grid resolution of 30 m. (b) Results for the reference model. (c) Results with a model size of 100x100 km.

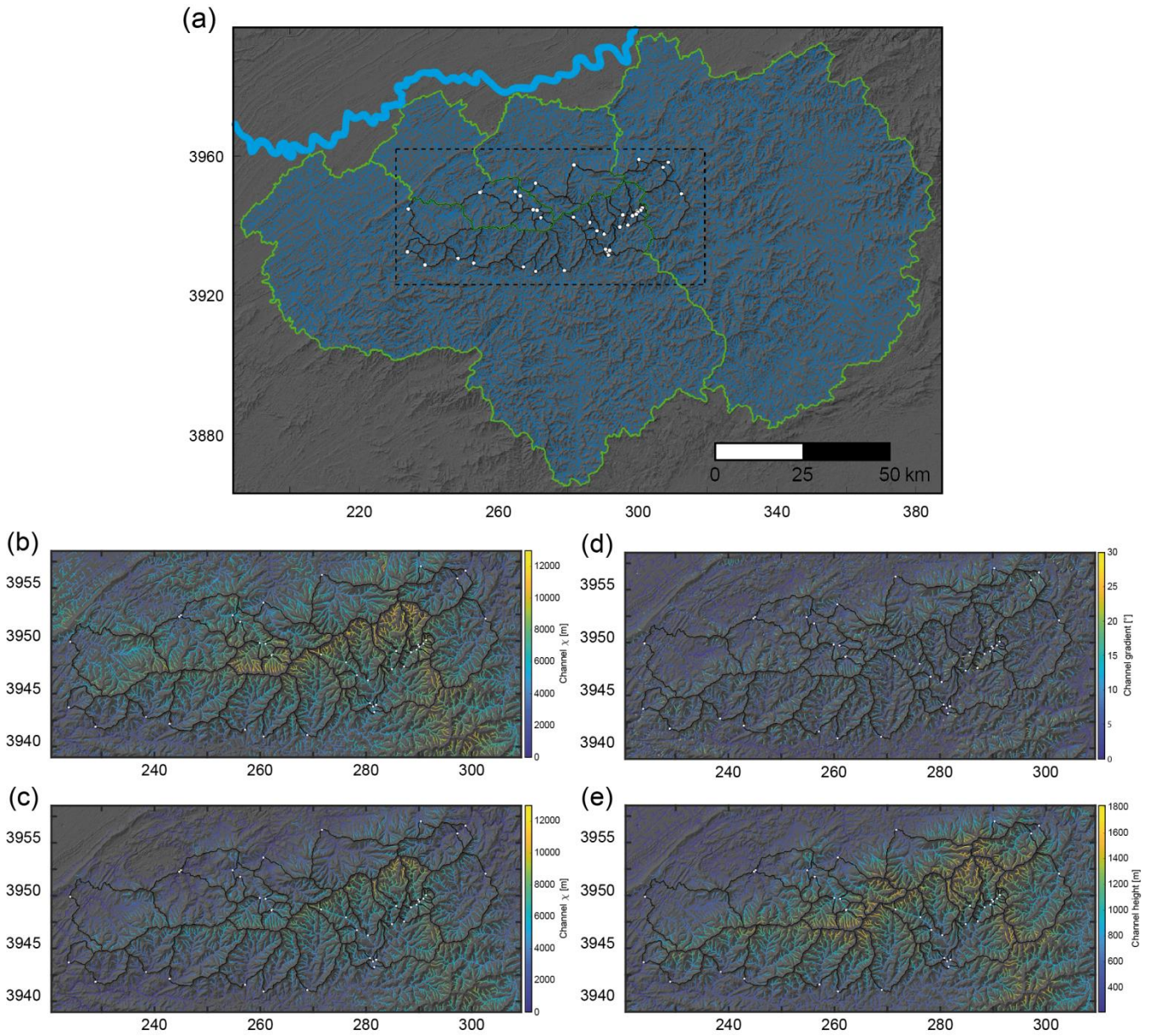


Figure S3: Maps of basins sampled by Matmon et al., 2003a in the Great Smoky Mountains. Black lines and white circles show the limits and the outlets of the basins sampled by Matmon et al., 2003a, respectively. (a) Regional map of the southern Appalachian range (UTM17 grid). Thick blue line represents the Tennessee river. Thin blue lines correspond to the drainage networks that drain water down to the Tennessee River. Drainage network is extracted from an accumulation map using a minimal area of 0.2 km². Green lines show the limits of the watersheds associated with these drainage networks. The extended view of the Great Smoky Mountains (area enclosed by the dashed line in (a)) show : (b) a map of χ integrated from the confluence with the Tennessee river ; (c) a map of χ integrated from a constant elevation $H_b = 400$ m ; (d) a channel gradient map ; (e) a channel height map.