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**Relaxation of a plastic fold**[1] MORGAN CERVO, NARAYANAN MENON, U. of Massachusetts, Amherst — Crumpled objects have been observed to show stress relaxation when confined to a constant volume, and to show creep when subjected to a constant load. These relaxation processes are described by logarithmic (or other similarly slow) functional dependences on waiting time. In an effort to understand the microscopic elements responsible for this slow collective relaxation, we study the mechanics of a single fold in a thin strip of polycarbonate sheet (typical dimensions: thickness t=0.127 mm, length L=14 cm, and width w=2cm). We create folds of different initial opening angles by placing the strip under varying loads. We then measure the opening angle as a function of time. We find that even one isolated fold is sufficient to mimic the relaxation behavior of the composite crumpled sheet: the unfolding process is logarithmic in time. The unfolding rate depends on sheet thickness, but surprisingly is independent of initial opening angle. We have observed qualitatively similar behavior in metal and paper sheets.

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