A Cloudmaking Tool for CG
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We use an arbitrary vertical temperature profile for the background atmosphere in a cloud simulation. The temperature profile controls cloud buoyancy, directly affecting vertical cloud shape. We present a tool for easily setting the temperature profile, thereby controlling cloud base and height.

Skew-T Log(P):
Meteorological Chart

Given the cloud base, temperature and cloud top, it works out the temperature profile needed to generate the cloud. It does this by setting up vertical regions of different stabilities.

A parcel of air will rise due to buoyancy when its temperature is greater than the background temperature (i.e. while it stays on the right hand side of the black temperature profile line in the Skew-T chart). As a warm parcel from ground level rises, its temperature follows a potential temperature line. The parcel contains an amount of water. The height at which the potential temperature line crosses the mixing ratio line of its water level is the saturation point. The cloud will start forming here. If the parcel continues to rise, its temperature follows a saturated adiabat line. If it crosses the temperature profile line, buoyancy will become negative and it will sink back down.

Results

Right: using the tool to create clouds of different heights
Left: an advanced user can directly set the profile to create layered clouds.