



Reverse Skew-T A Cloudmaking Tool for CG



A Cloudmaking Tool for CG

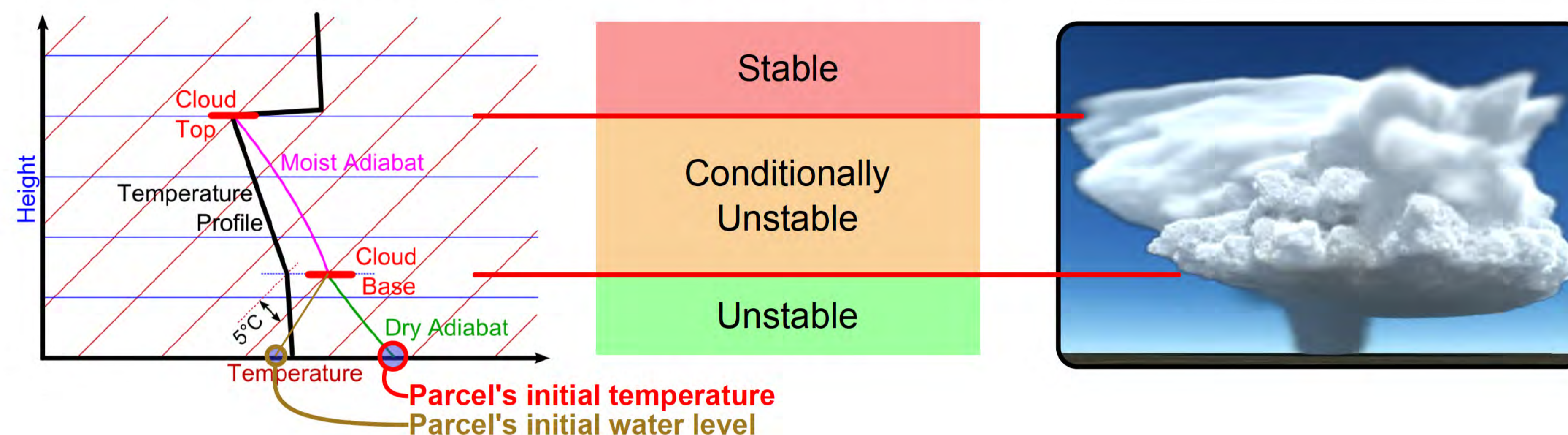
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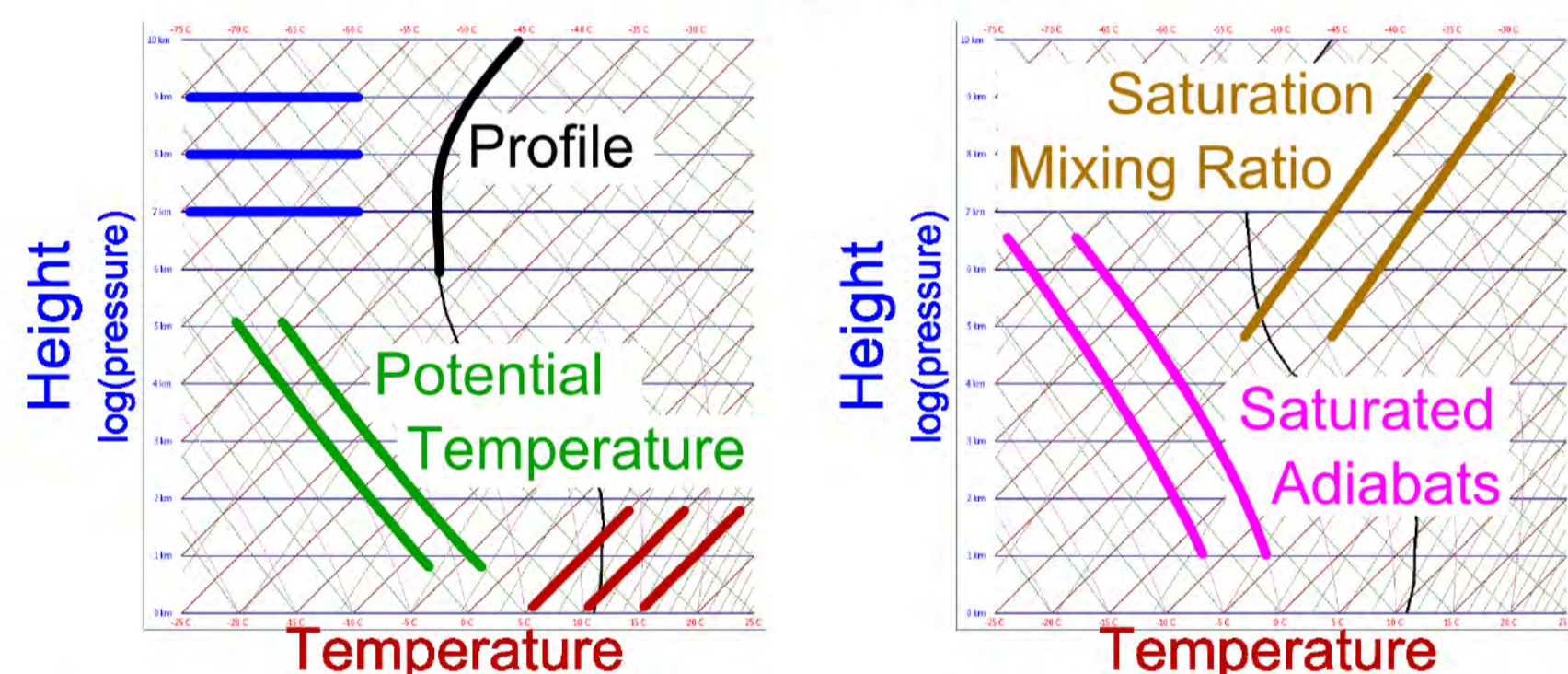
We use an arbitrary vertical temperature profile for the background atmosphere in a cloud simulation. The temperature profile controls cloud buoyancy, directly affecting vertical cloud shape. We present a tool for easily setting the temperature profile, thereby controlling cloud base and height.

Reverse Skew-T Tool

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.

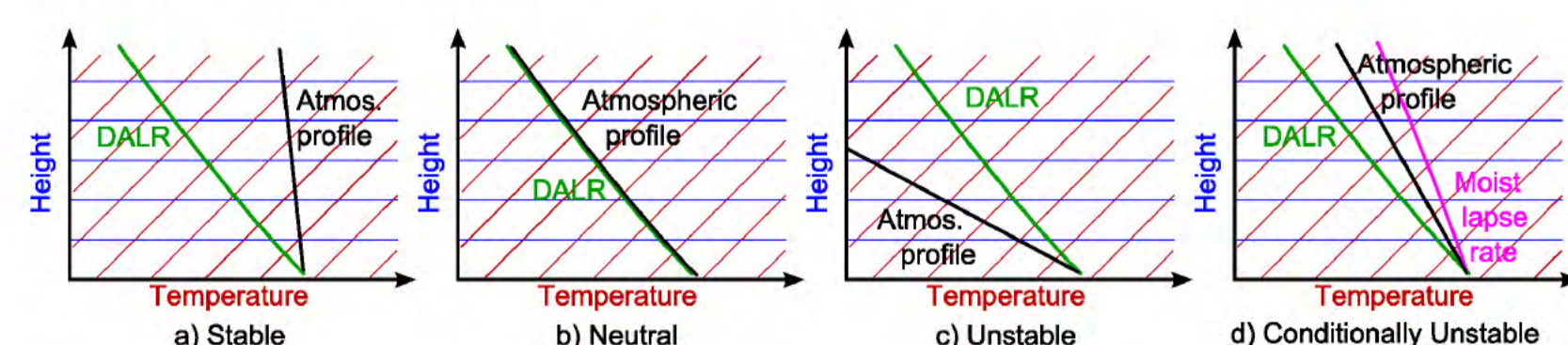


Skew-T Log(P): Meteorological Chart



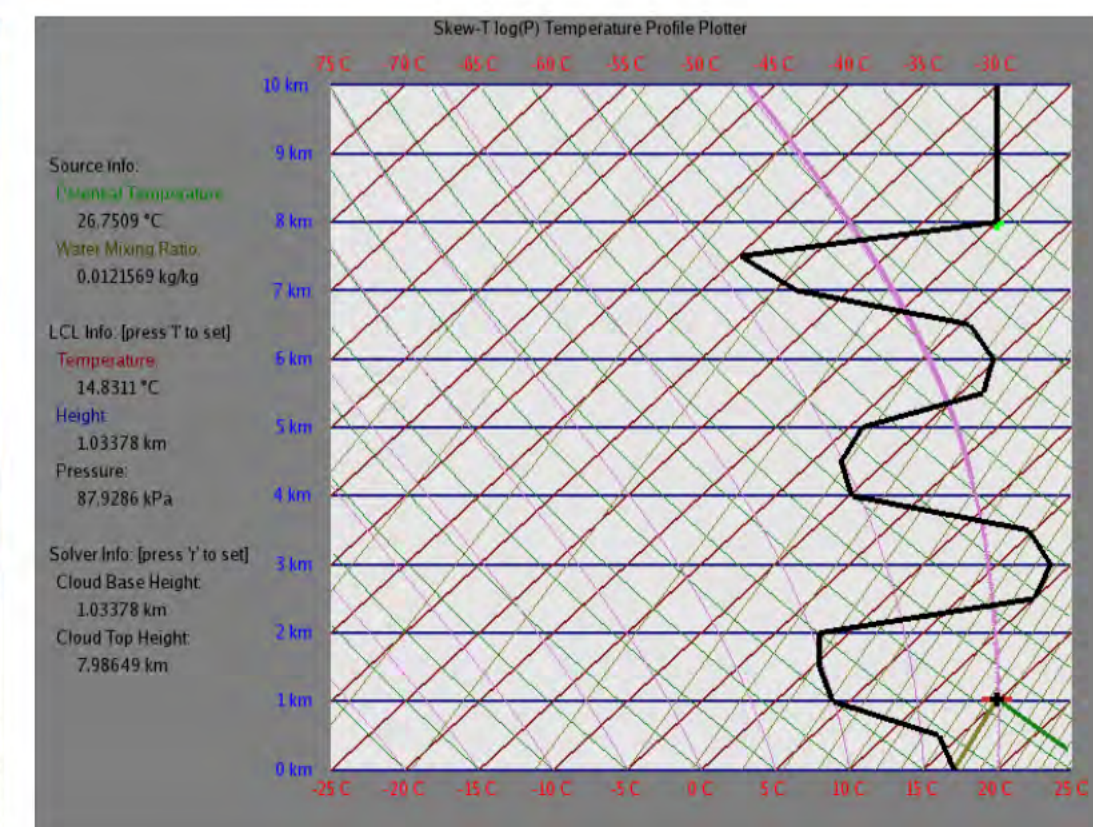
A parcel of air will rise due to buoyancy when its temperature is greater than the background temperature (i.e. while it stays on the right hand side of the **black temperature profile line** in the Skew-T chart). As a warm parcel from ground level rises, its **temperature** follows a **potential temperature** 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.

For plotting how temperature varies with height in the atmosphere.

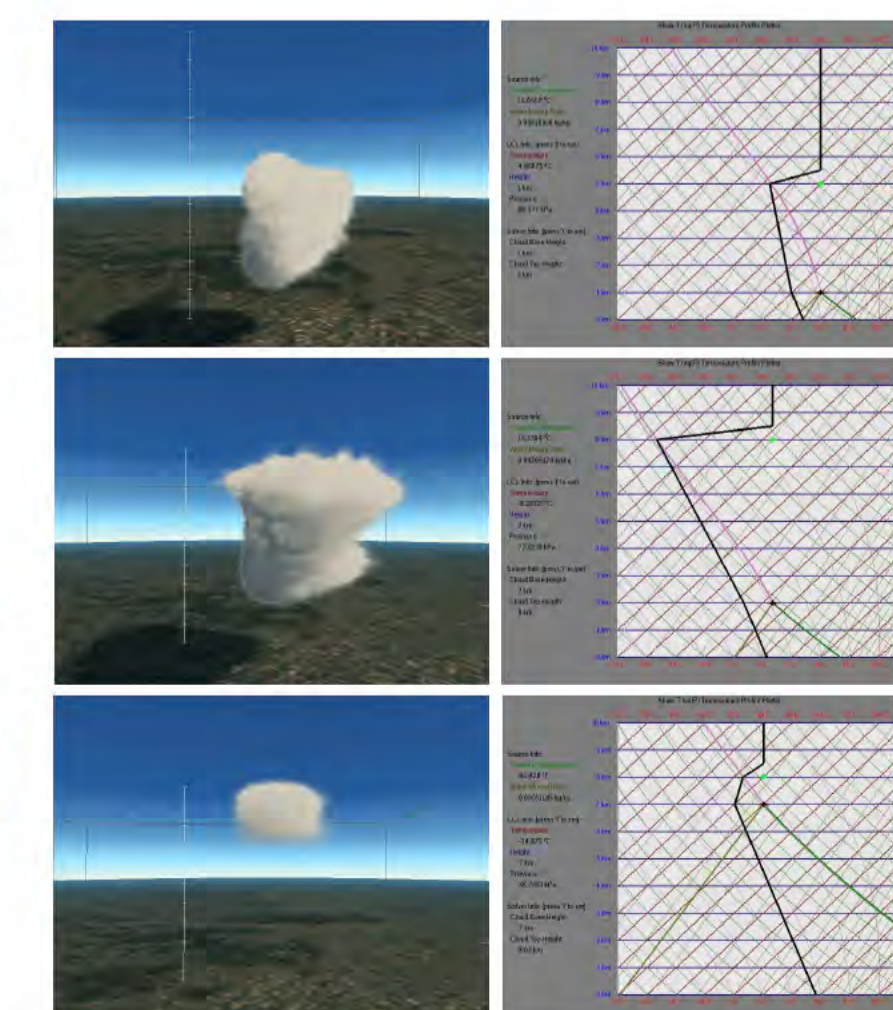


Parcels sink in stable regions (a), remain where they are in neutral regions (b), rise in unstable regions (c) and only moist parcels rise in conditionally stable regions (d).

Results



Right: using the tool to create clouds of different heights



Left: an advanced user can directly set the profile to create layered clouds.