Previous observational and modeling studies have shown that variations in surface albedo and, therefore, surface heat fluxes and temperature, can form mesoscale circulations over the Sahara desert. If these circulations are strong enough, they can inject air (and mineral dust) out of the convective boundary layer (CBL) into the free troposphere, where horizontal advection can carry the dust long distances from its source. Additionally, mesoscale circulations can induce subsidence remote from the surface “hot-spot” that inhibits the day-time growth of the CBL. The Hoggar are a range of mountains in South-East Algeria, which exceed 3000m above sea level and have a lower surface albedo than the surrounding desert. These mountains act as an elevated heat source and it has been proposed that they produce a similar but stronger effect to that observed over simple land surface temperature anomalies. Three model experiments are performed: a control case, a run with the orography in the Hoggar region removed and a run with both the orography and the surface albedo variations removed. It is shown that a plume of hot air over the main peaks can inject material through the residual layer, to altitudes of 8km. The mountains produce a deeper and warmer CBL up to 300 km west of the main peaks. However, although there is an influence on the atmosphere through gravity waves more than 700 km west of the mountains, this influence is not large enough to substantially change the model boundary layer at these remote locations.