The ice ball condition for the planet with gray atmoshpere.

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Numerical simulations with an atmospheric GCM are performed
to investigate the ice ball conditions of the terrestrial
planets. The model utilized is based on 3D spherical primitive
equation. Gray radiation and convective adjustment are
implemented. The surface is covered with ocean and sea ice
exists in low temperature region. The growth rate and heat
budget of sea ice are evaluated using the model of
Semtner (1988). Ice albedo is 0.2 and albedo in other region
is zero. Parameter study is performed with various values of
solar constant and terrestrial annual mean distribution of solar
radiation. The results show that ice ball earth emerges with the
values of solar constant under 1100 W/m**2. The critical value,
1100 W/m**2, almost equals that obtained by 1D energy balance
model