Three-Dimensional Cloud Properties and Climate

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The interaction of clouds with solar and terrestrial radiation is one of the most important topics of climate research. Because of the complexity of clouds, only full three-dimensional (3D) treatment of this interaction can provide answers to many climate and remote sensing problems. This has led to worldwide development of various 3D radiative transfer (RT) codes, documented in the international "Intercomparison of 3 Dimensional Radiation Codes" (I3RC) (See http://i3rc.gsfc.nasa.gov/). We will address several related questions: How do the physical and radiative properties of clouds depend on resolution? How do cloud scaling or fractal properties impact Earth's climate, or does it matter? How might cloud scaling properties help improve the measurement and modeling of clouds? What breakthroughs might be expected in cloud research in the next decade?