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The need and potential for building a integrated knowledge-base of the Earth-Human system

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The pursuit of scientific understanding is increasingly based on interdisciplinary research. To understand more deeply the planet and its interactions requires a progressively more holistic approach, exploring knowledge coming from all scientific and engineering disciplines including but not limited to, biology, chemistry, computer sciences, geosciences, material sciences, mathematics, physics, cyberinfrastructure, and social sciences. Nowhere is such an approach more critical than in the study of global climate change in which one of the major challenges is the development of next-generation Earth System Models that include coupled and interactive representations of ecosystems, agricultural working lands and forests, urban environments, biogeochemistry, atmospheric chemistry, ocean and atmospheric currents, the water cycle, land ice, and human activities.

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