Regional Earth System Prediction for Asia:
A Decision-Making Tool for Sustainability

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While the IPCC will continue to lead Earth System projections for global issues such as greenhouse gas levels and global temperature increase, high-resolution regional Earth System Predictions will be crucial for producing effective decision-making tools for day-to-day, sustainable Earth System management and adaptive management of resources. Regional Earth System predictions and projections at the order of a few meters resolution from days to decades must be validated and provide uncertainties and skill scores to be usable. While the task is daunting, it would be criminally negligent of the global human not to embark on this task immediately. The observational needs for the integrated natural-human system for the regional Earth System are distinct from the global needs even though there are many overlaps. The process understanding of the Earth System at the micro scale can be translated into predictive understanding and skillful predictions for sustainable management by merging these observations with Earth System models to go from global scale predictions and projections to regional environmental manifestations and mechanistic depiction of human interactions with the Earth System and exploitation of its resources. Regional Earth System monitoring and predictions thus will continuously take the pulse of the planet to prescribe appropriate actions for participatory decision-making for sustainable and adaptive management of the Earth System and to avoid catastrophic domains of potential outcomes. As the host to the largest fraction of planetary population and being the center of gravity for rapid development, Asia faces unique challenges but also offers unprecedented opportunities for leap-frogging the follies of the Western model for growth. Predictive information for energy, water, food, and health at days to decades will be essential for this sustainable growth trajectory and the Regional Earth System Prediction framework offers just such a tool at an opportune time.