



Global Change Mitigation & Geoengineering Design: a Systems Framework

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A wide variety of mitigation options have been proposed as potential responses to the threat of rapid climate change and lost biodiversity driven by anthropogenic activities. New technologies and regulation of fossil-fuel emissions are necessary but may be too little, too late to avoid irreversible and catastrophic tipping-point events. This motivates serious consideration of additional aggressive measures including various geo-engineering schemes. There is a critical need to systematically analyze, develop, and prepare for the potential rapid deployment of geo-engineering measures as part of a larger suite of mitigations and adaptation activities. There also exists a need to develop an appropriate “situational awareness” (monitoring and verification) capability to effectively manage them.

The Earth represents the ultimate System of Systems and should be treated as such. This paper describes a proposed systems engineering framework including the necessary processes and tools to guide the selection, design, development, validation, and operation of global change mitigations including geo-engineering.