Every aspect of human operations faces a wide range of risks, some of which can cause serious consequences. By the start of 21st century, mankind has recognized a new class of risks posed by climate change. It is obvious, that the global climate is changing, and will continue to change, in ways that affect the planning and day to day operations of businesses, government agencies and other organizations and institutions. The manifestations of climate change include but not limited to rising sea levels, increasing temperature, flooding, melting polar sea ice, adverse weather events (e.g. heatwaves, drought, and storms) and a rise in related problems (e.g. health and environmental). Assessing and managing climate risks represent one of the most challenging issues of today and for the future. The purpose of the risk modeling system discussed in this paper is to provide a framework and methodology to quantify risks caused by climate change, to facilitate estimates of the impact of climate change on various spheres of human activities and to compare eventual adaptation and risk mitigation strategies. The system integrates both physical climate system and economic models together with knowledge-based subsystem, which can help support proactive risk management. System structure and its main components are considered. Special attention is paid to climate risk assessment, management and hedging in the Arctic coastal areas.