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Climate change-related risks and adaptation measures in South and Central America during the 21st century

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The consequences of climate change in South and Central America are already widespread and take on many forms. Albeit there is an increasing number of studies focusing on specific climate change-related risks in the region, a synthesis of risks for the 21st century, together with current and future adaptation options is lacking. This study synthesizes major climate related risks in South and Central America, while also looking at implications for adaptation measures and (un)avoidable loss and damage. A review of over 100 peer-reviewed articles published since 2013 was completed to examine the current and projected state of the risks. We identify eight key risks in South and Central America that have the potential to become severe with climate change during the 21st century. The criteria for a severe risk relate to the number of people potentially affected, the severity of the negative effects of the risk, the importance of the affected systems, and the irreversibility versus potential to reduce the risk. The risks are analysed in relation to different climate scenarios, and changes in associated hazards, exposure, and/or vulnerability. The risks include 1: risk of food insecurity due to repeated and/or extreme drought conditions; 2: risk to life and infrastructure due to floods and landslides; 3: risk of water insecurity in Central America and the Andes region; 4: systemic risks of surpassing infrastructure and public service system capacities due to cascading impacts of storms, floods and epidemics; 5: risk of severe health effects due to increasing epidemics (in particular vector-borne diseases); 6: risk of large-scale ecological transformation of the Amazon forest; 7: risk to coral reef ecosystems due to coral bleaching in Central America; 8: risk to coastal socio-ecological systems due to sea level rise, intensification of upwelling and ocean acidification. In addition, we focus on already implemented and possible adaptation measures for each of the risks. Subsequently, we draw conclusions of the potential losses and damages caused by each risk. Our assessment of risks in the Central and South America region show that several risks have the potential to become severe already in the near future. The extent of the severity is driven by the specific region's exposure, vulnerability and adaptation capacity. Adaptation capacity is in turn dependent on physical as well as socio-economic systems. Inequalities, corruption, and poor communication between decision makers, stakeholders and the scientific community together with a lack of available data can critically limit

adaptation options. Still, many adaptation options are available, and efforts to thoroughly research further adaptation measures should be of highest priority. This will undoubtedly save both lives and severe economic damage as South and Central America face the consequences of climate change.