Channeled Scabland floods: numerical simulaitons and their implications in field evidences

Hideaki Miyamoto[1], Goro Komatsu[2], Kazumasa Itoh[3], Hiroyuki Tosaka[3], Tomochika Tokunaga[4], Sho Sasaki[5]

[1] Geosystem Engineering, Univ. Tokyo, [2] IRSPS, [3] Geosystem eng., Univ. Tokyo, [4] Dept. Geosystem Eng., Univ. Tokyo, [5] Earth and Planetary Sci., Univ. Tokyo

http://www.geosys.t.u-tokyo.ac.jp/miyamoto

Major controversy regarding the origin of the Channeled Scabland is whether the landforms were formed mainly by multiple floods or by a grand-scale cataclysmic flood from late Pleistocene glacial Lake Missoula. Through numerical simulations, we found that calculations based on the glacial lake failure scenario were not consistent with the field data. On the other hand, the calculated results assuming that the flood volume was three times larger than that of Lake Missoula were consistent with observed geographical features. We also found that locations of outcrops where periodic outbursts were suggested through geological observations were easily inundated by relatively small scale floods, indicating that the history of the floods is more complex than the ice dam failure scenario.

Major controversy regarding the origin of the Channeled Scabland is whether the landforms were formed mainly by multiple floods produced by periodic outbursts or by a grand-scale cataclysmic flood from late Pleistocene glacial Lake Missoula. We developed a semi-three dimensional numerical model to calculate flood flows for quantitative discussions to this debate. We found that calculations based on the glacial lake failure scenario were not consistent with the field data. On the other hand, the calculated results assuming that the flood volume was three times larger than that of Lake Missoula were consistent with observed geographical features. We also found that locations of outcrops where periodic outbursts were suggested through geological observations were easily inundated by relatively small scale floods, indicating that the history of the floods is more complex than the ice dam failure scenario.