

Figure S1. Summary Plot of *Constant Traction* models with small (5.0 km) nucleation radius, showing the total slip at the end of the simulation for three different nucleation locations. Nucleation locations are marked with black dots. Note that due to reduced slip near the fault edge, maximum slip is not at the exact position of nucleation. (A) Nucleation on SB. (B) Nucleation on WSG. (C) Nucleation on GH. Total slip magnitude is given in meters. With the exception of nucleation on the WSG, all models result in through-going rupture propagation across the Pass.

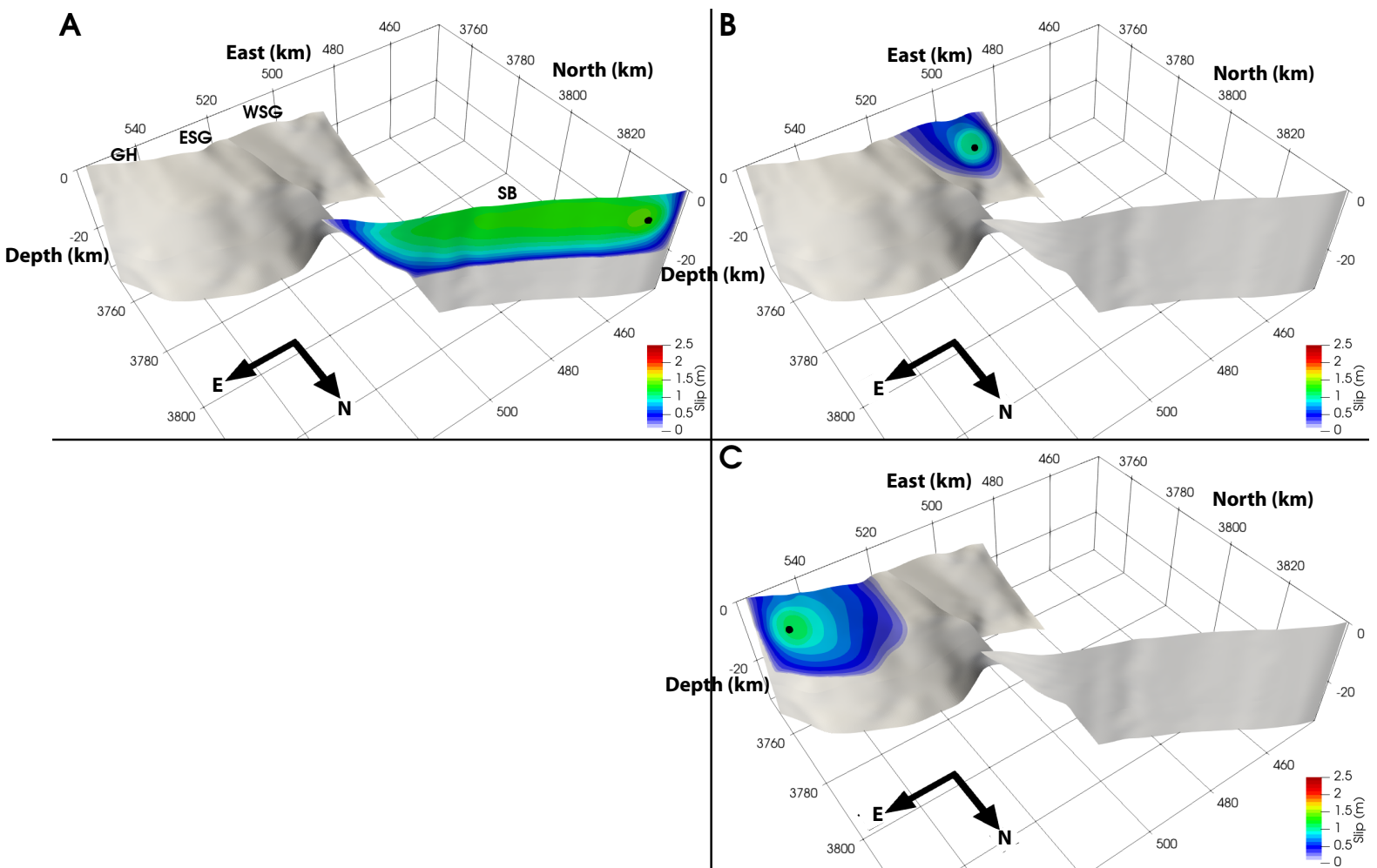


Figure S2. Summary Plot of *Regional Stress* models with small (5.0 km) nucleation radius, showing the total slip at the end of the simulation for three different nucleation locations. Nucleation locations are marked with black dots. Note that due to reduced slip near the fault edge, maximum slip is not at the exact position of nucleation. (A) Nucleation on SB. (B) Nucleation on WSG. (C) Nucleation on GH. Total slip magnitude is given in meters.

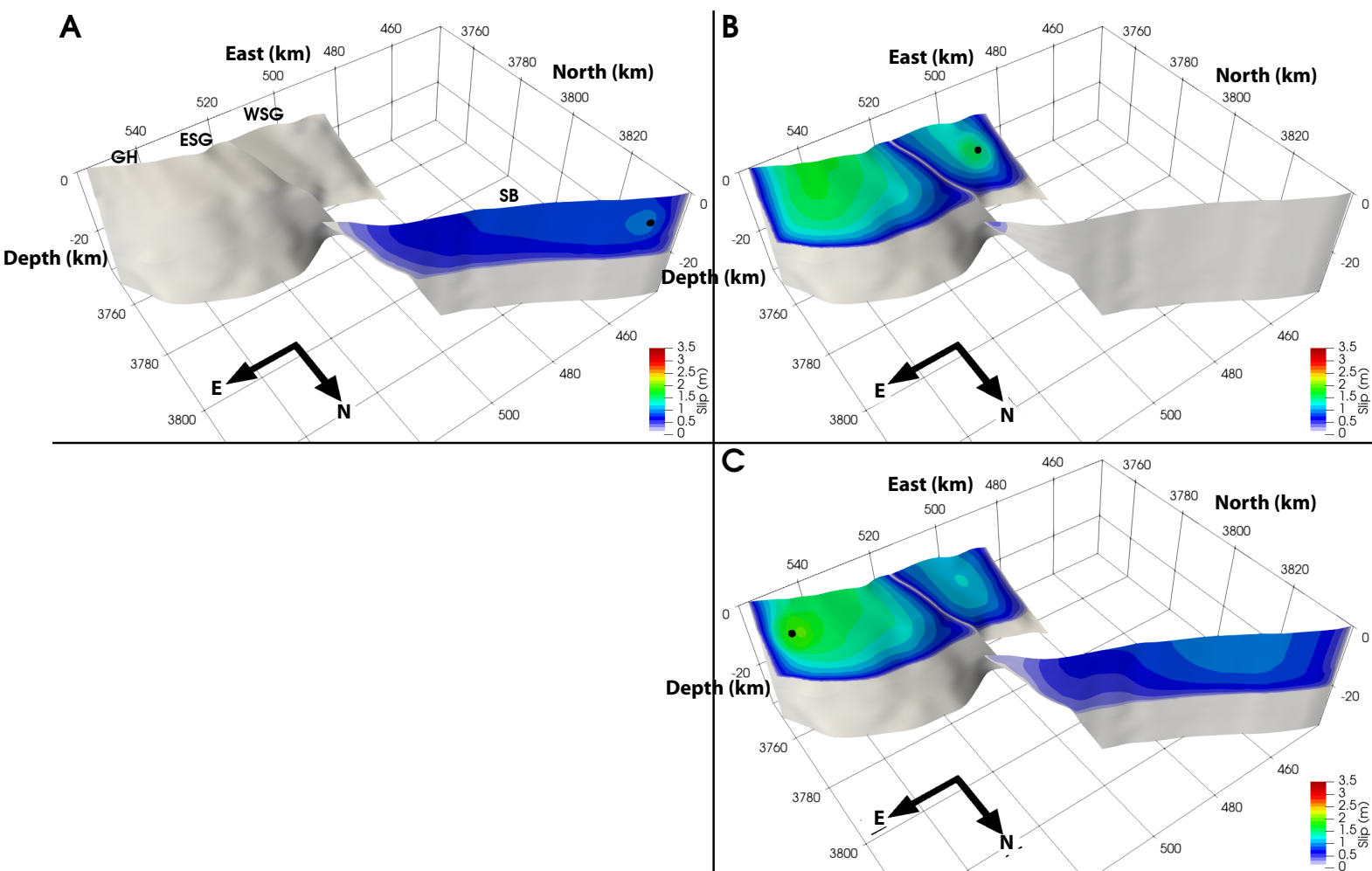


Figure S3. Summary Plot of *Evolved Stress* models with small (5.0 km) nucleation radius, showing the total slip at the end of the simulation for three different nucleation locations. Nucleation locations are marked with black dots. Note that due to reduced slip near the fault edge, maximum slip is not at the exact position of nucleation. (A) Nucleation on SB. (B) Nucleation on WSG. (C) Nucleation on GH. Total slip magnitude is given in meters. Nucleation on the GH produces rupture that propagates through the Pass.

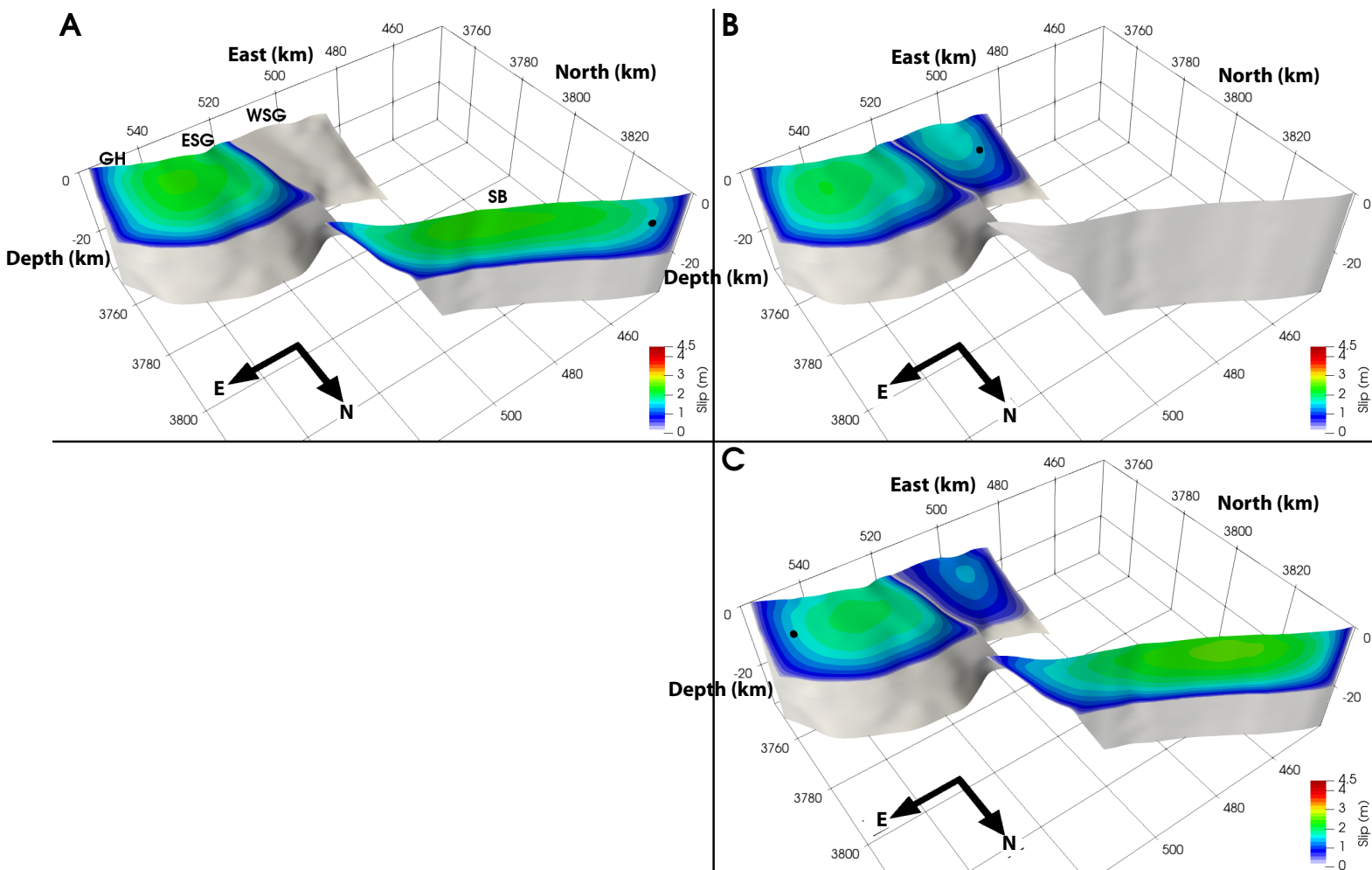


Figure S4. Summary Plot of *Constant Traction* models with nucleation via reduced static friction, showing the total slip at the end of the simulation for three different nucleation locations. Nucleation locations are marked with black dots. Note that due to reduced slip near the fault edge, maximum slip is not at the exact position of nucleation. (A) Nucleation on SB. (B) Nucleation on WSG. (C) Nucleation on GH. Total slip magnitude is given in meters. With the exception of nucleation on the WSG, all models result in through-going rupture propagation across the Pass.

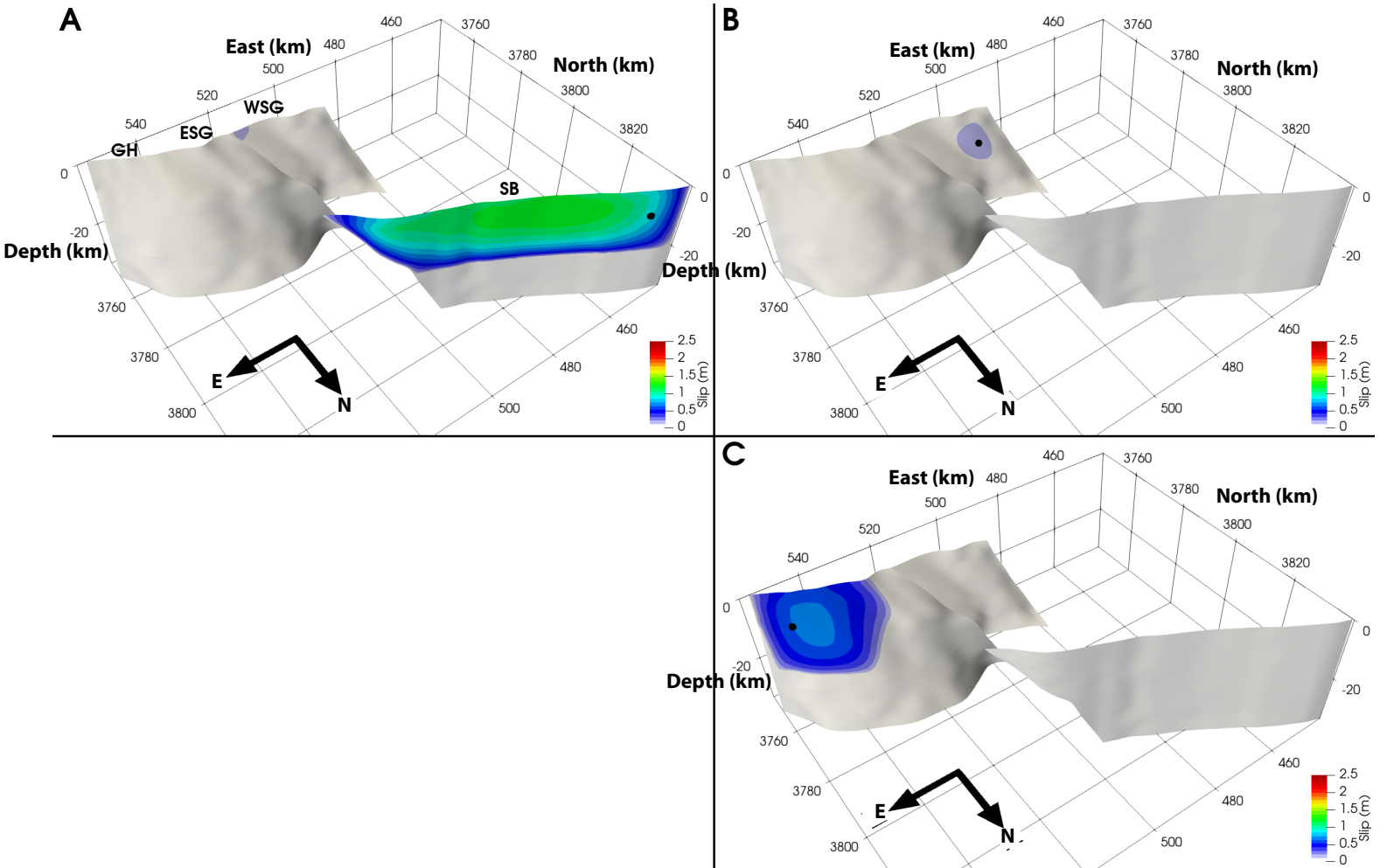


Figure S5. Summary Plot of *Regional Stress* models with nucleation via reduced static friction, showing the total slip at the end of the simulation for three different nucleation locations. Nucleation locations are marked with black dots. Note that due to reduced slip near the fault edge, maximum slip is not at the exact position of nucleation. (A) Nucleation on SB. (B) Nucleation on WSG. (C) Nucleation on GH. Total slip magnitude is given in meters.

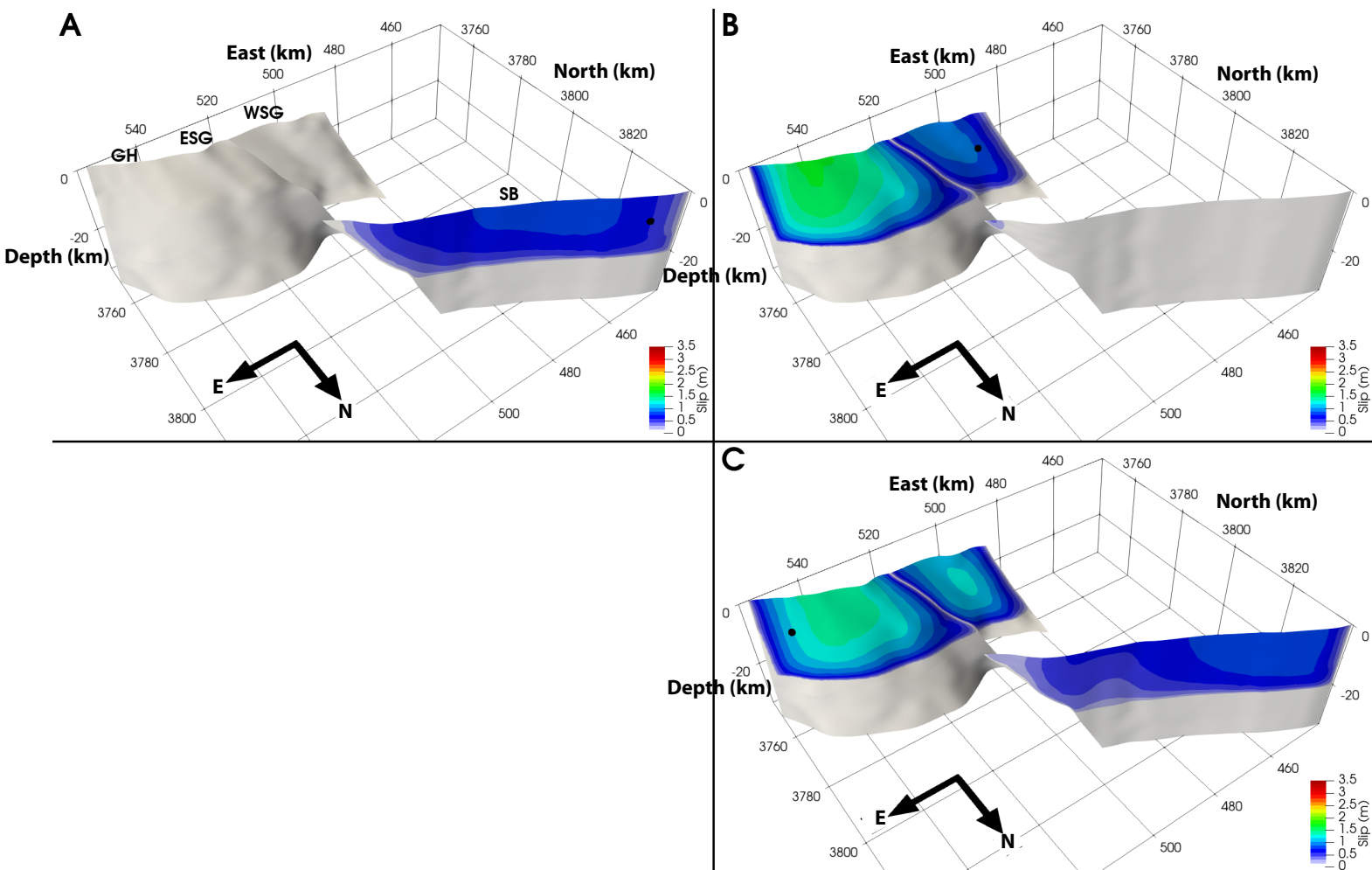


Figure S6. Summary Plot of *Evolved Stress* models with nucleation via reduced static friction, showing the total slip at the end of the simulation for three different nucleation locations. Nucleation locations are marked with black dots. Note that due to reduced slip near the fault edge, maximum slip is not at the exact position of nucleation. (A) Nucleation on SB. (B) Nucleation on WSG. (C) Nucleation on GH. Total slip magnitude is given in meters. Nucleation on the GH and Nucleation produces rupture that propagates through the Pass.

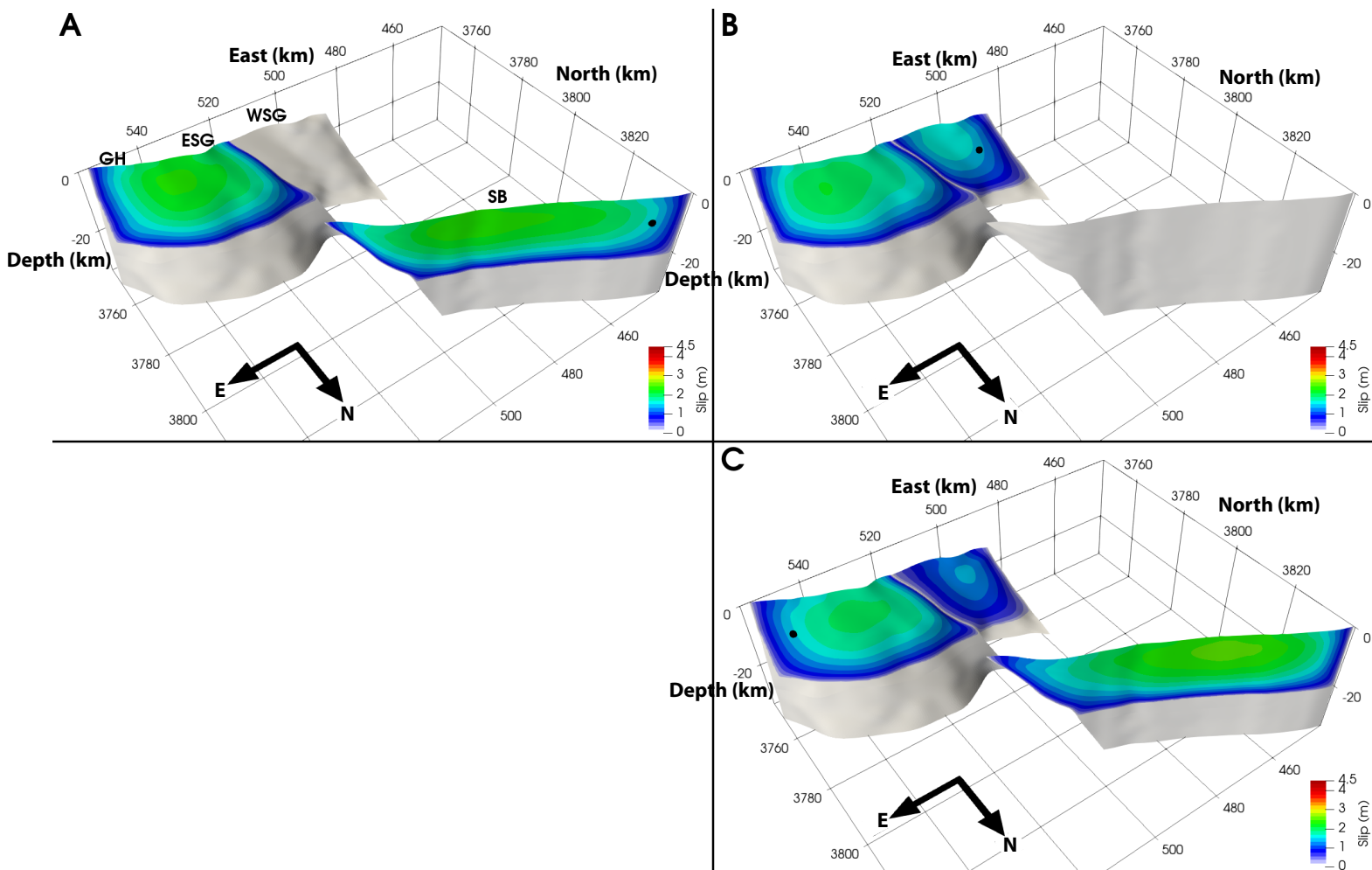


Figure S7. Summary Plot of *Constant Traction* models with nucleation via reduced static friction and small (5.0 km) nucleation radius, showing the total slip at the end of the simulation for three different nucleation locations. Nucleation locations are marked with black dots. Note that due to reduced slip near the fault edge, maximum slip is not at the exact position of nucleation. (A) Nucleation on SB. (B) Nucleation on WSG. (C) Nucleation on GH. Total slip magnitude is given in meters. With the exception of nucleation on the WSG, all models result in through-going rupture propagation across the Pass.

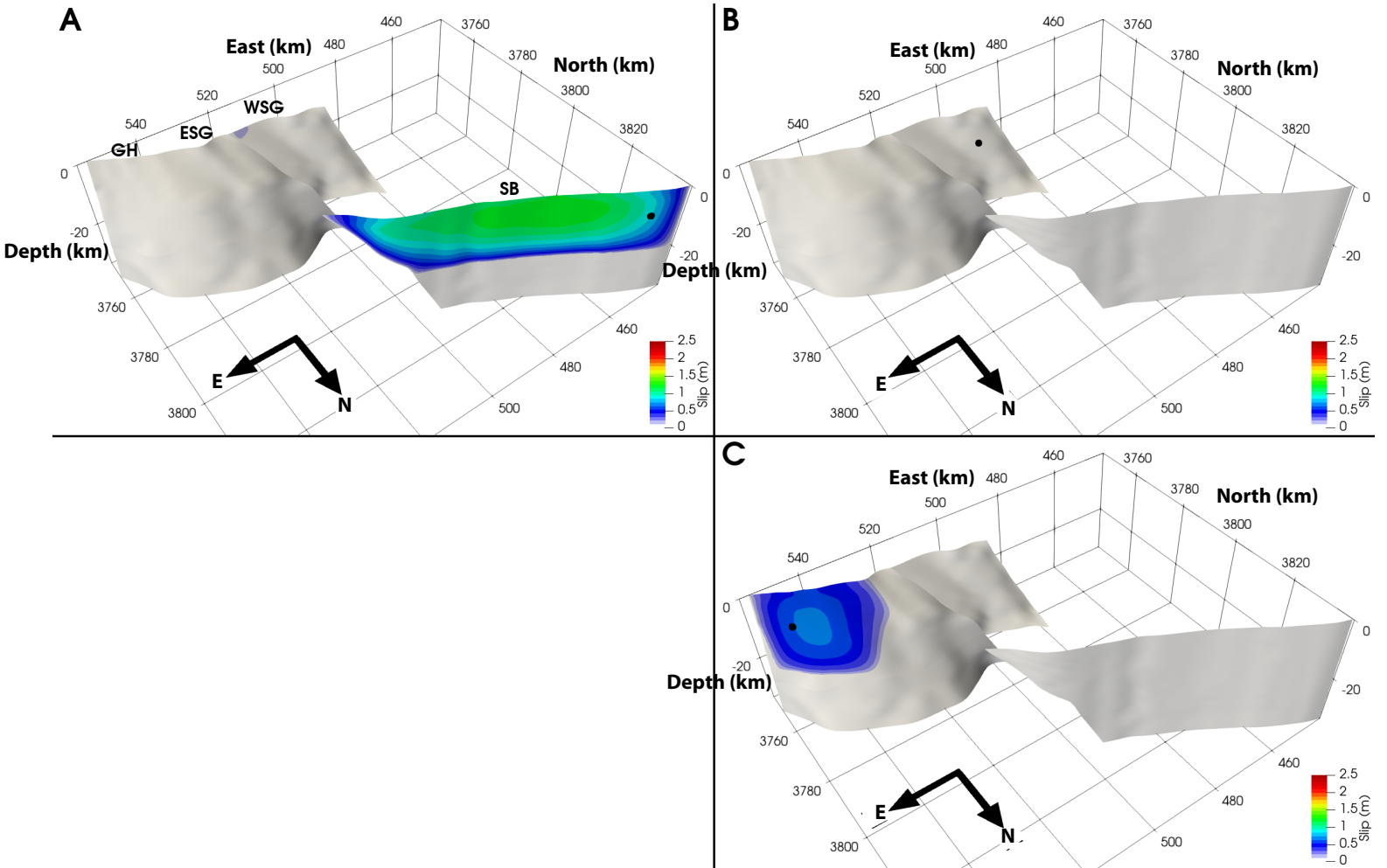


Figure S8. Summary Plot of *Regional Stress* models with nucleation via reduced static friction and small (5.0 km) nucleation radius, showing the total slip at the end of the simulation for three different nucleation locations. Nucleation locations are marked with black dots. Note that due to reduced slip near the fault edge, maximum slip is not at the exact position of nucleation. (A) Nucleation on SB. (B) Nucleation on WSG. (C) Nucleation on GH. Total slip magnitude is given in meters.

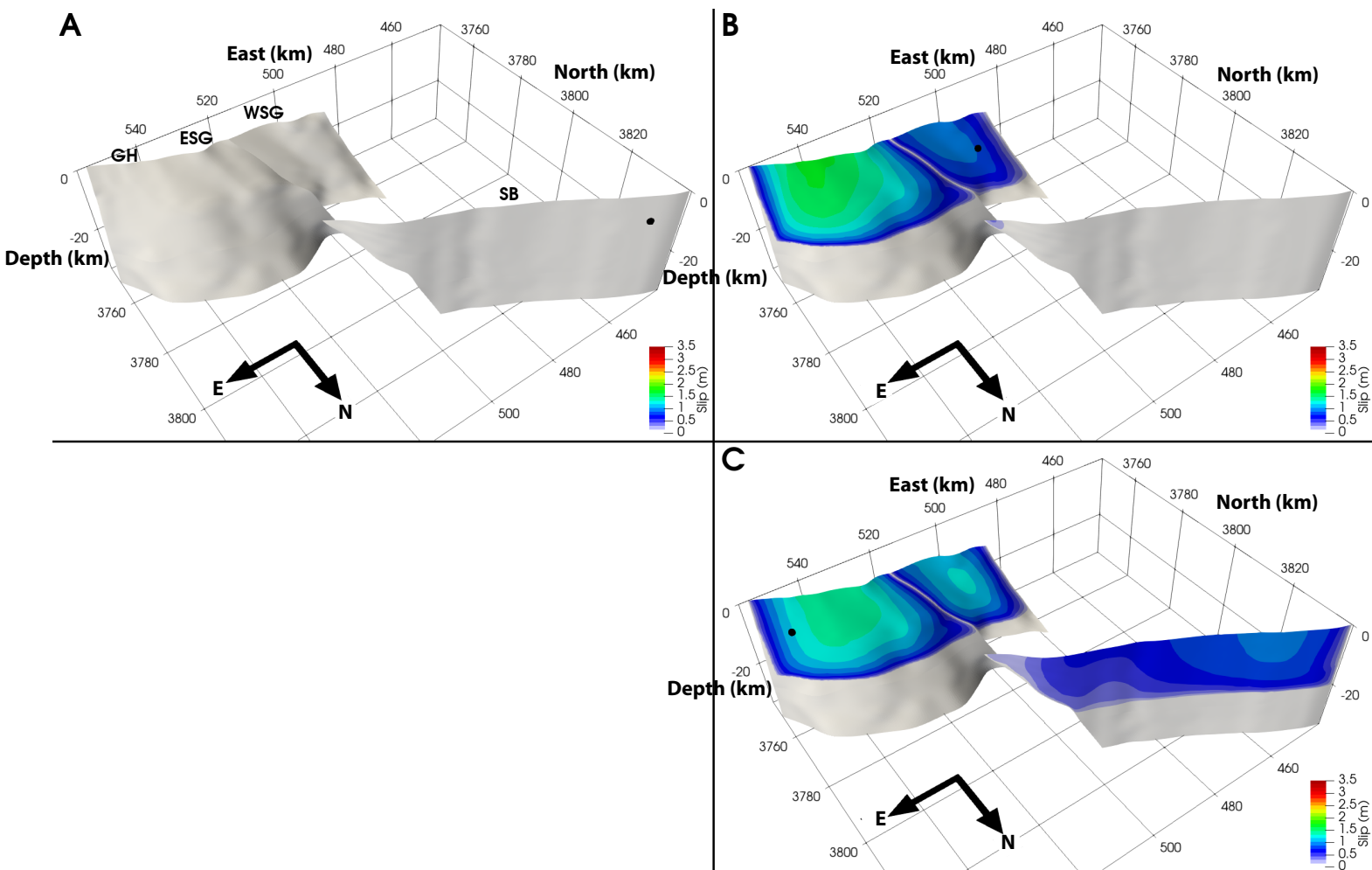


Figure S9. Summary Plot of *Evolved Stress* models with nucleation via reduced static friction and small (5.0 km) nucleation radius, showing the total slip at the end of the simulation for three different nucleation locations. Nucleation locations are marked with black dots. Note that due to reduced slip near the fault edge, maximum slip is not at the exact position of nucleation. (A) Nucleation on SB. (B) Nucleation on WSG. (C) Nucleation on GH. Total slip magnitude is given in meters. Nucleation on the GH produces rupture that propagates through the Pass.