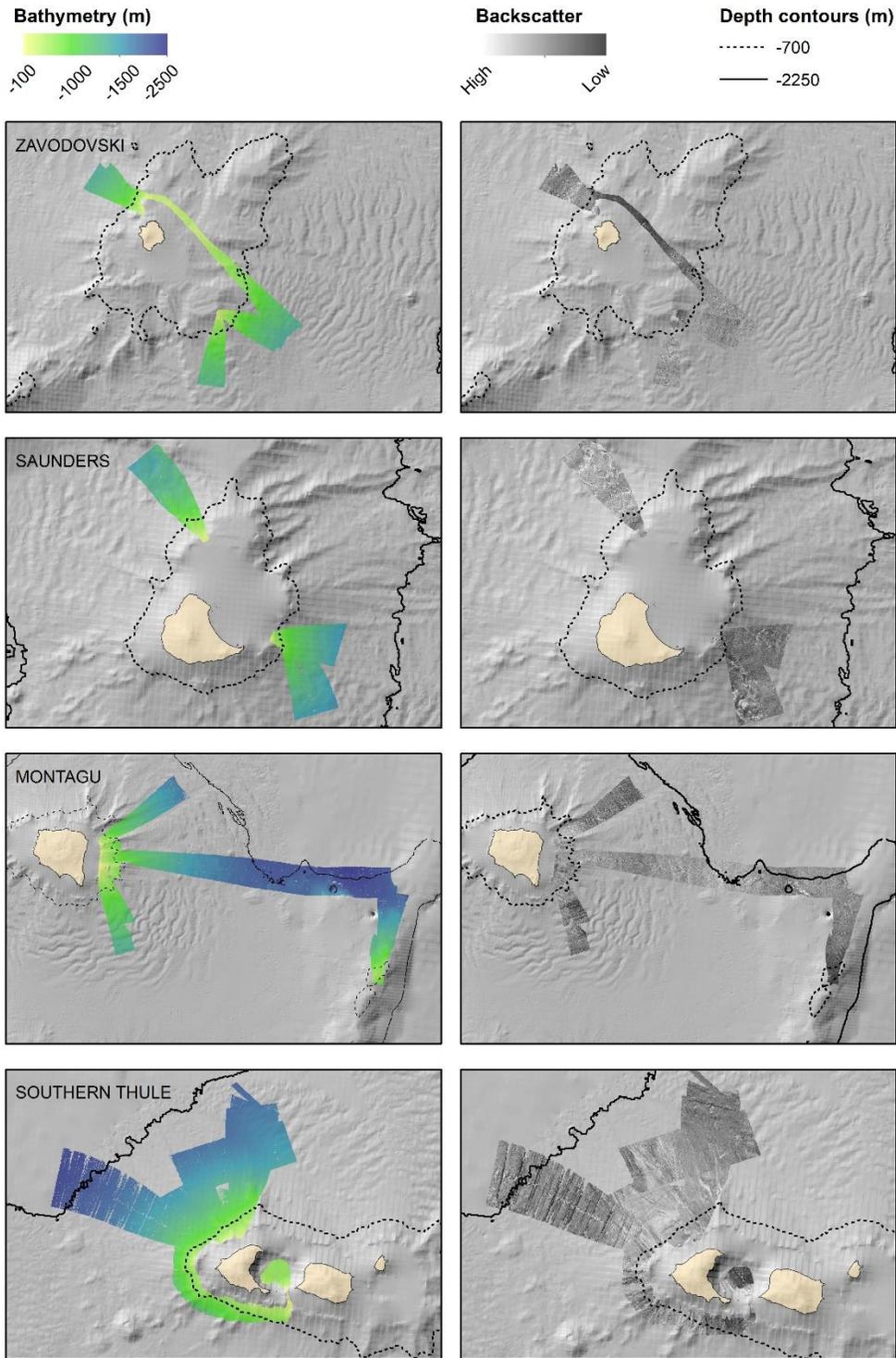
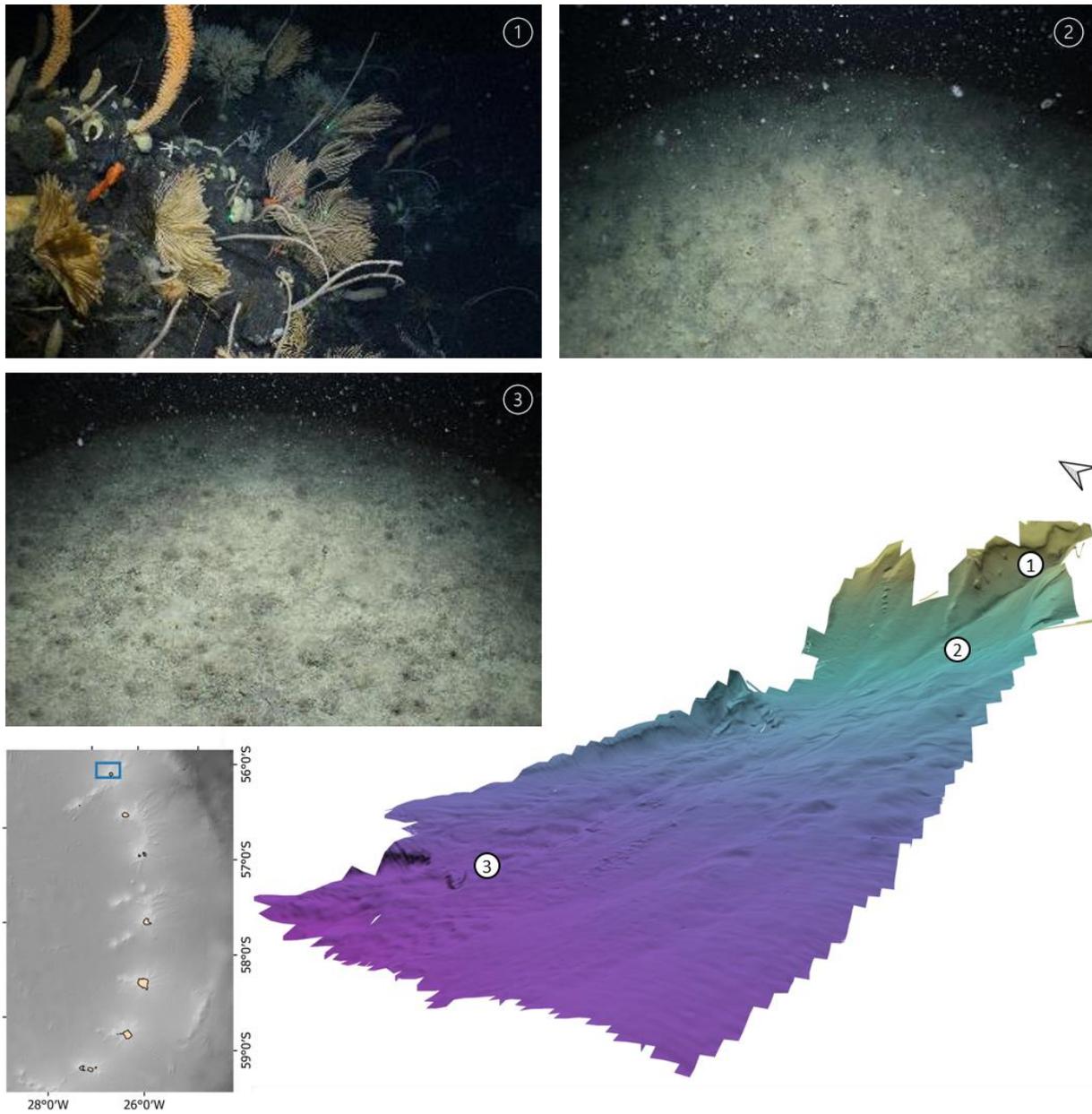


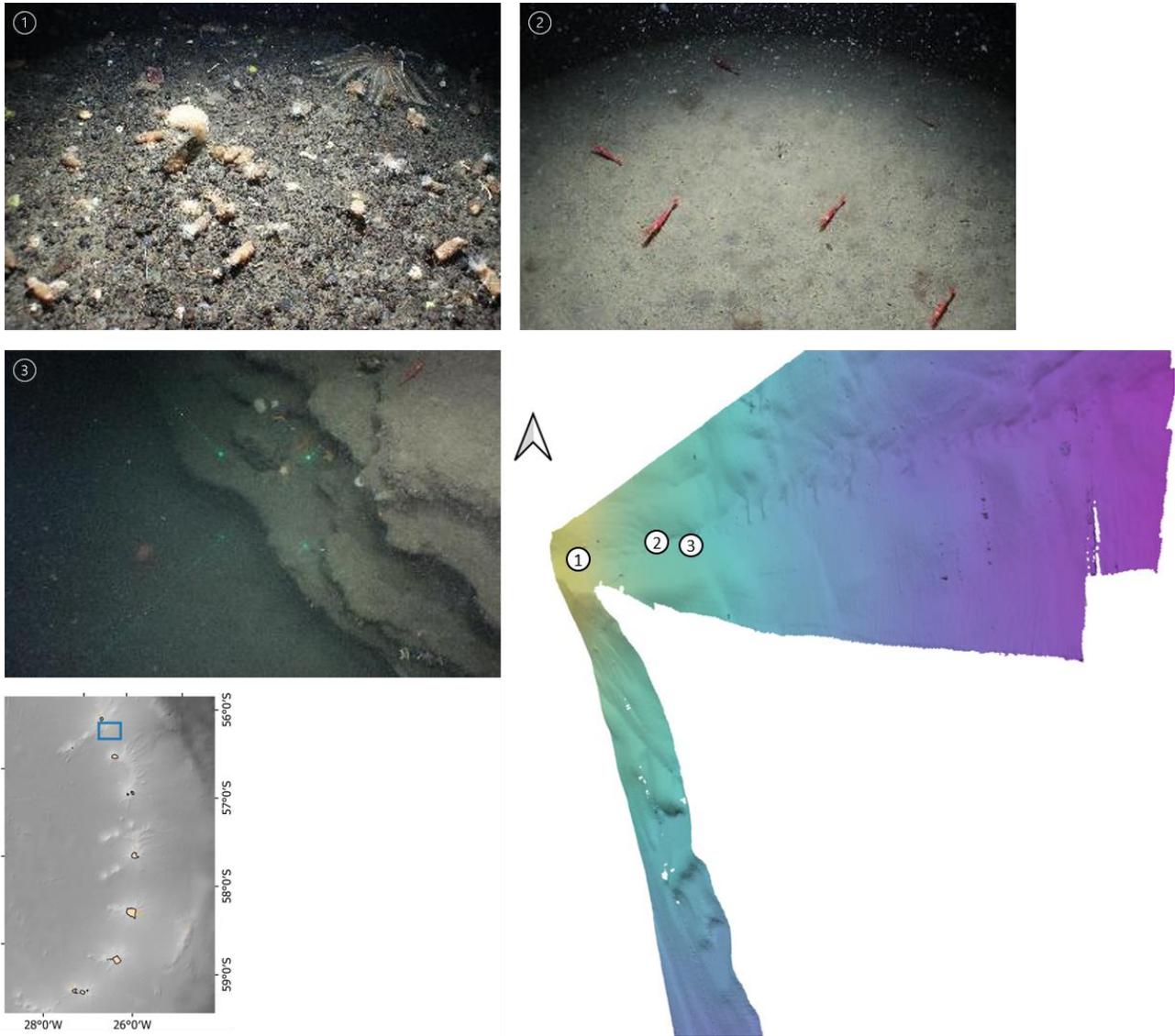
Supplementary Material



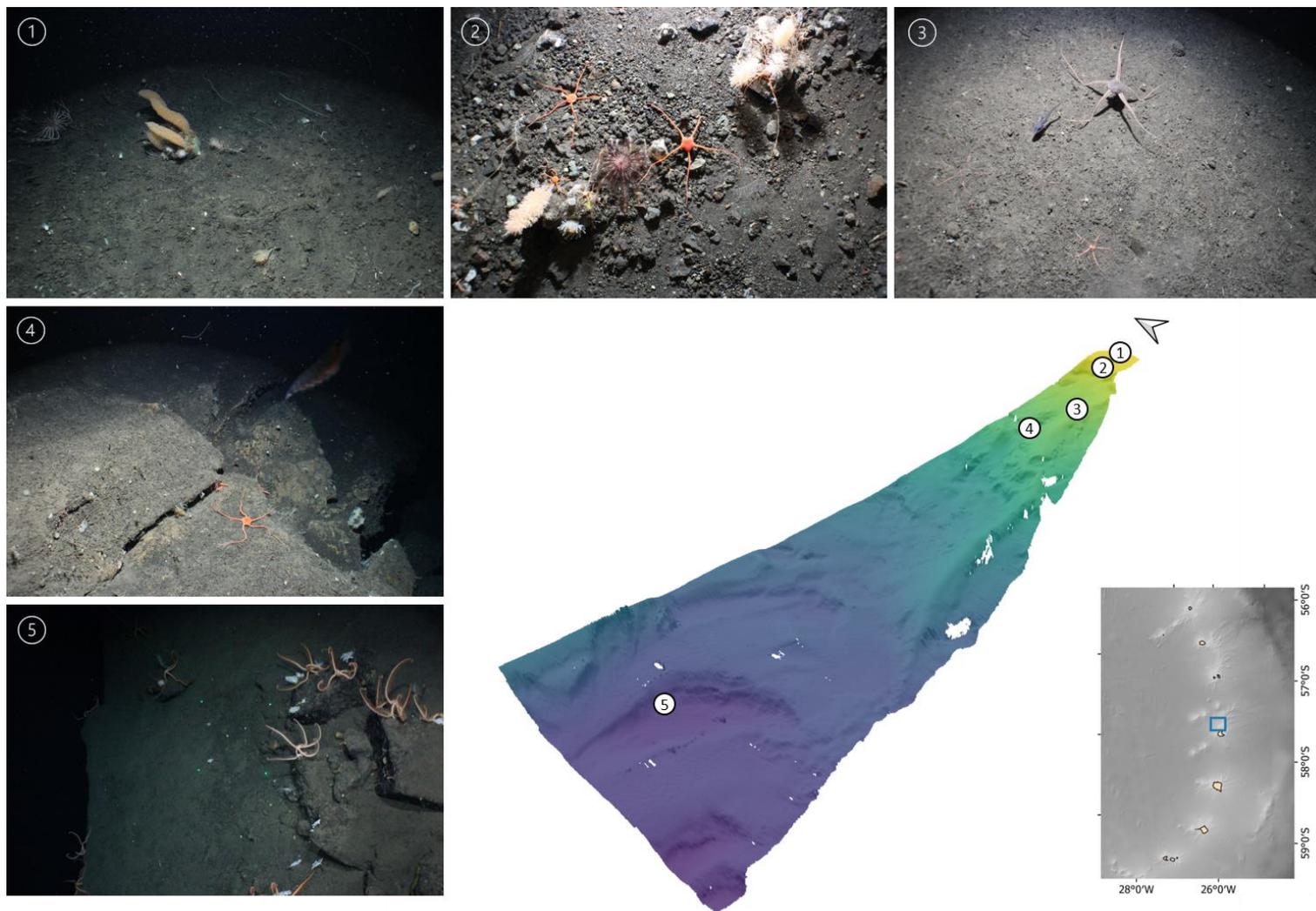
Supplementary Figure 1. Spatial coverage of multibeam bathymetry (left) and backscatter data (right) collected during the Blue Belt *Discovery* Expedition 99 (DY99).



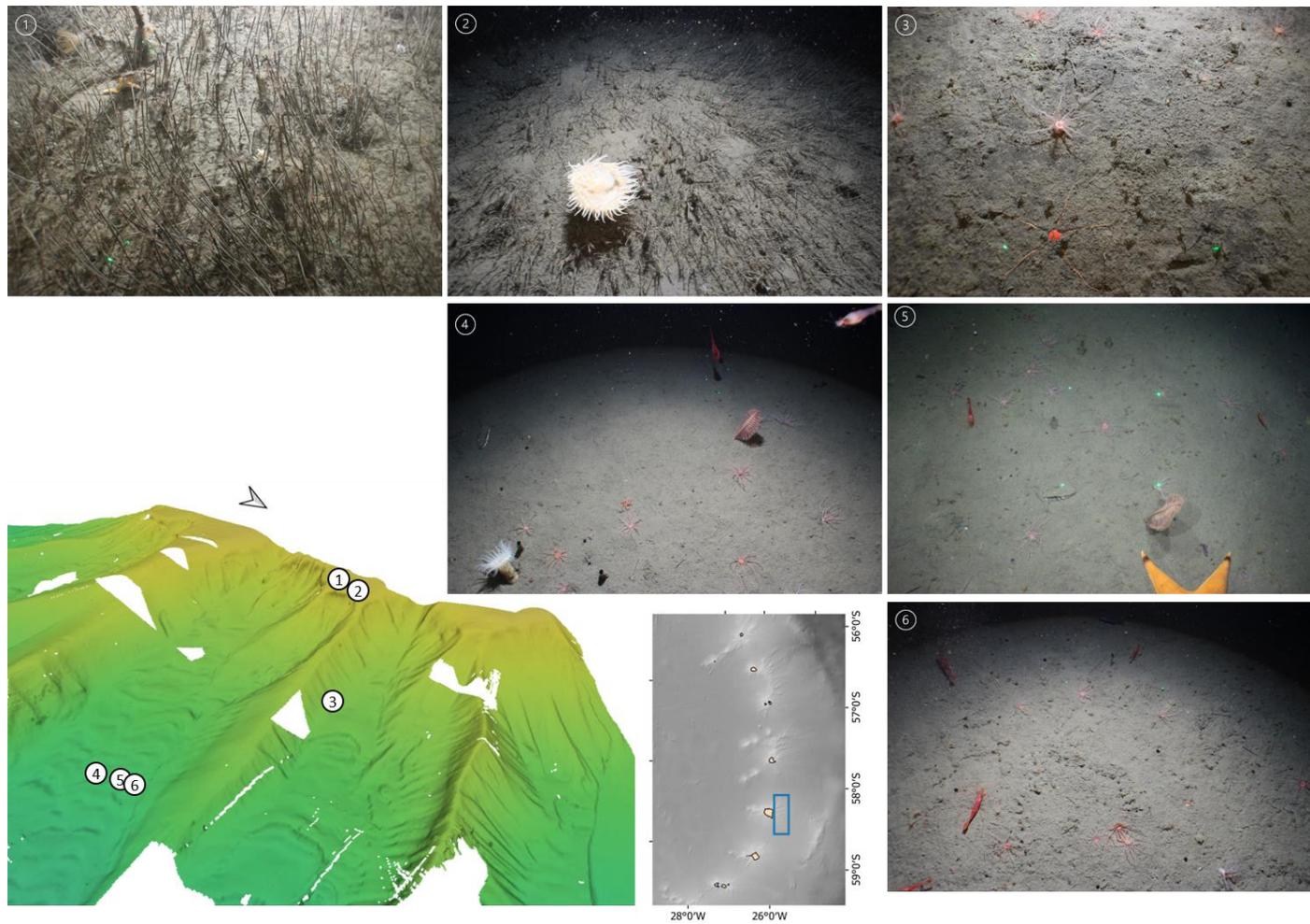
Supplementary Figure 2. MBES bathymetry for the western side of Zavodovski Island, and *in situ* images showing representative benthic habitats observed on the camera transects.



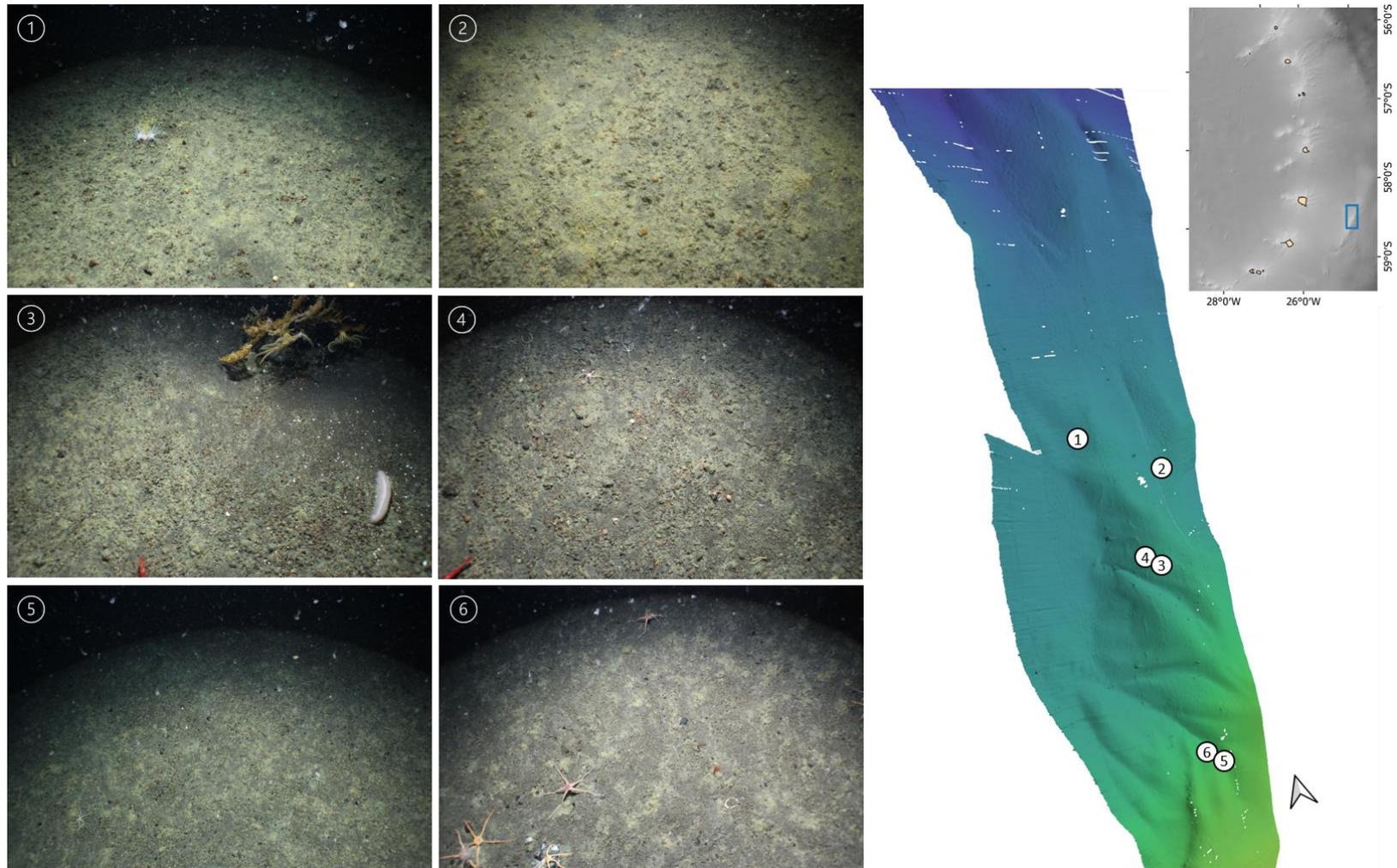
Supplementary Figure 3. MBES bathymetry for the eastern side of Zavodovski Island, and *in situ* images showing representative benthic habitats observed on the camera transects.



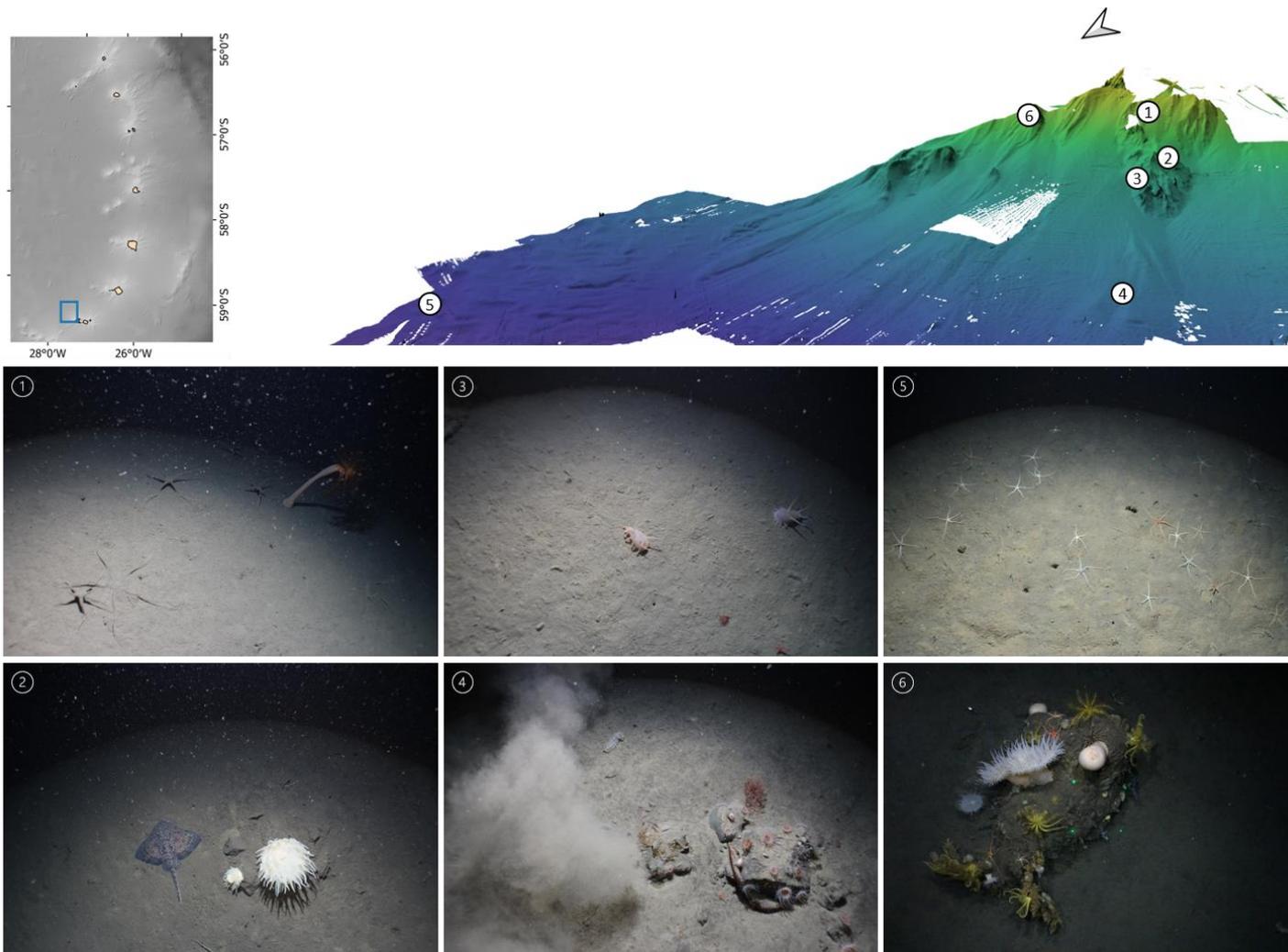
Supplementary Figure 4. MBES bathymetry for the northern side of Saunders Island, and *in situ* images showing representative benthic habitats observed on the camera transects.



Supplementary Figure 5. MBES bathymetry for the eastern side of Montagu Island, and *in situ* images showing representative benthic habitats observed on the camera transects.

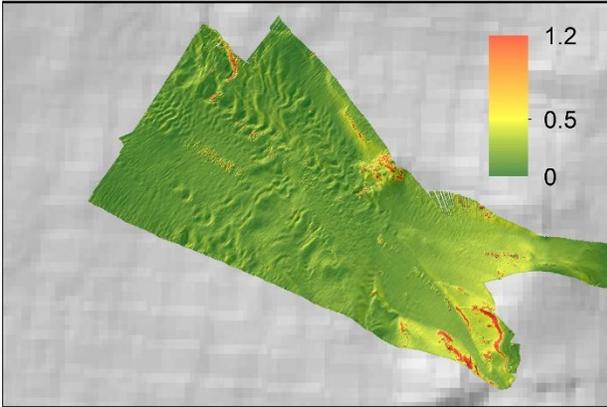


Supplementary Figure 6. MBES bathymetry for Montagu Bank, and *in situ* images showing representative benthic habitats observed on the camera transects.

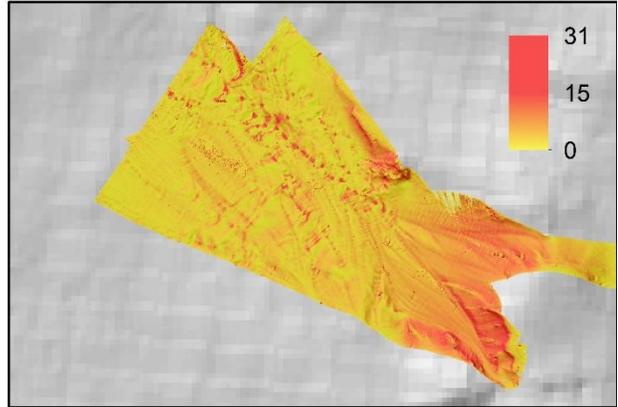


Supplementary Figure 7. MBES bathymetry for the Southern Thule, and *in situ* images showing representative benthic habitats observed on the camera transects.

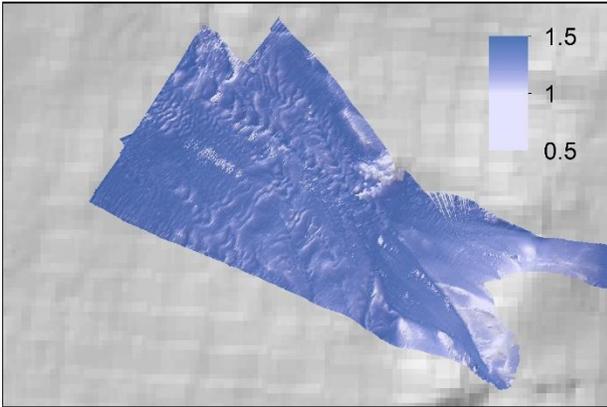
Slope



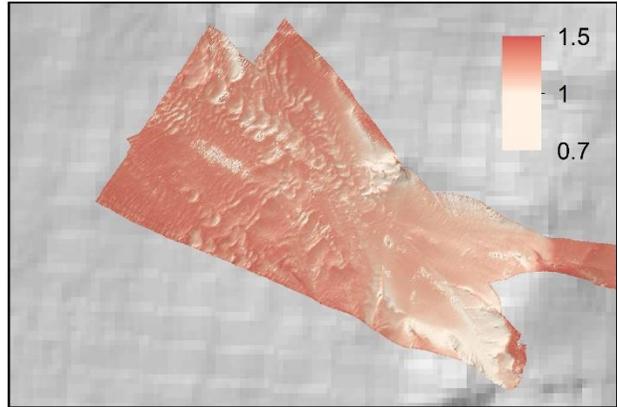
LS-Factor



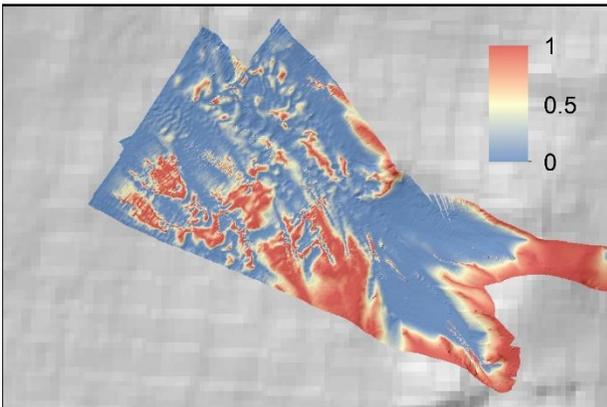
Negative Openness



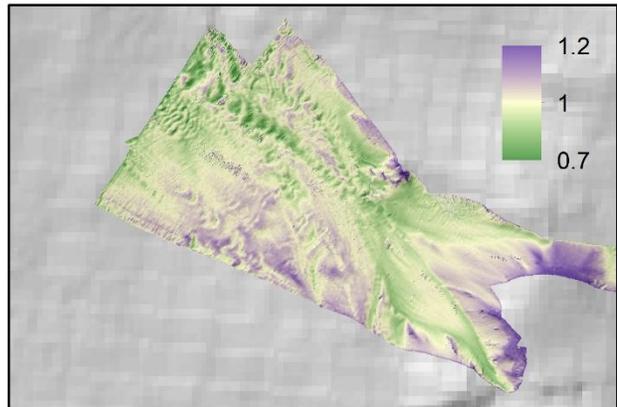
Positive Openness



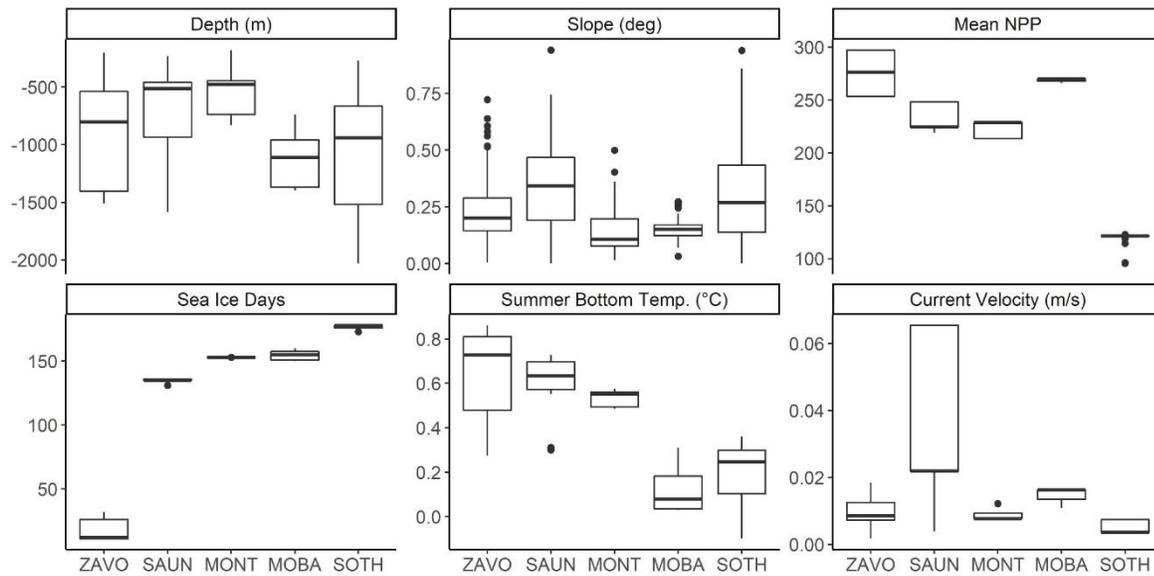
Relative Slope Position



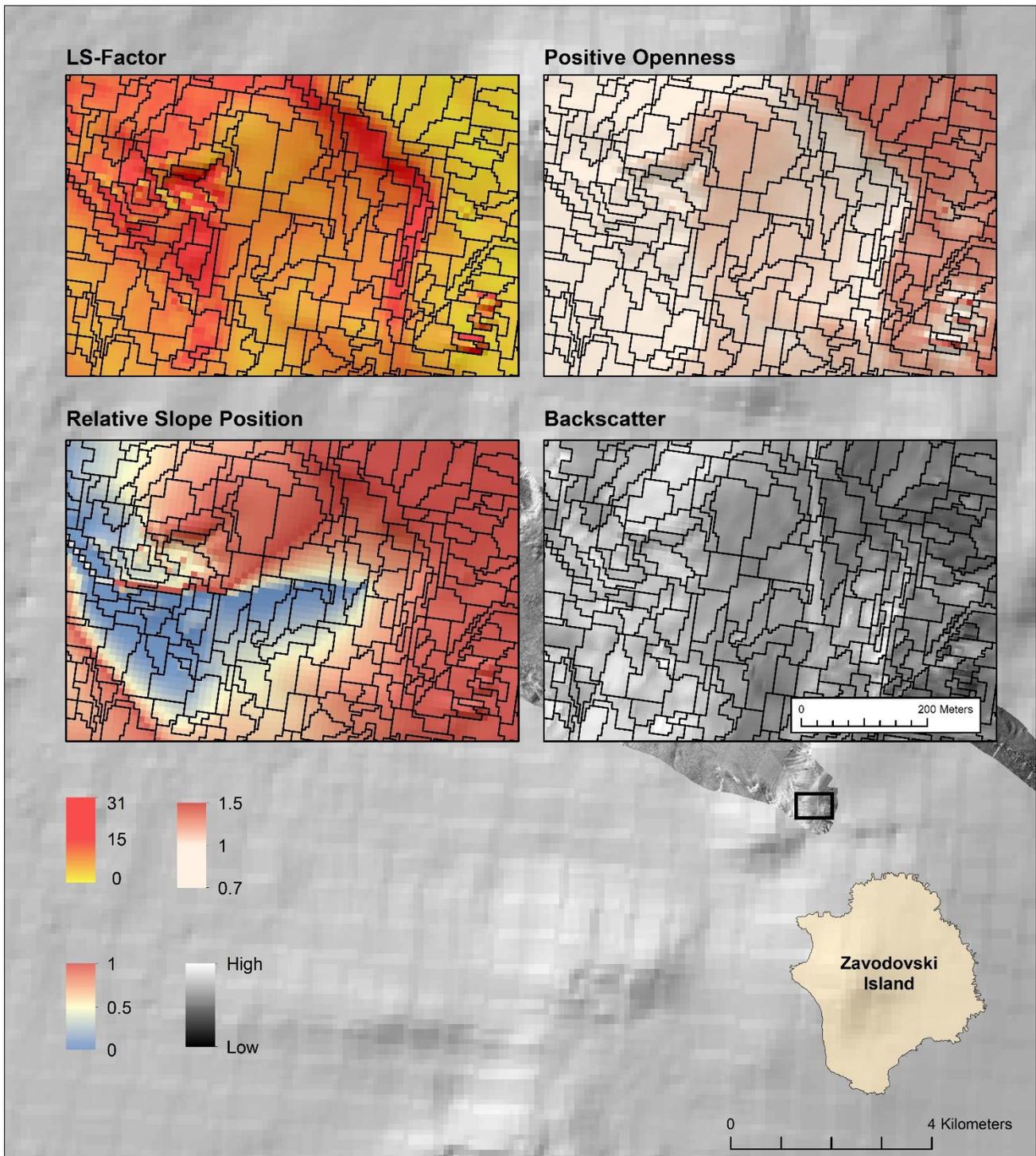
Wind Exposition Index



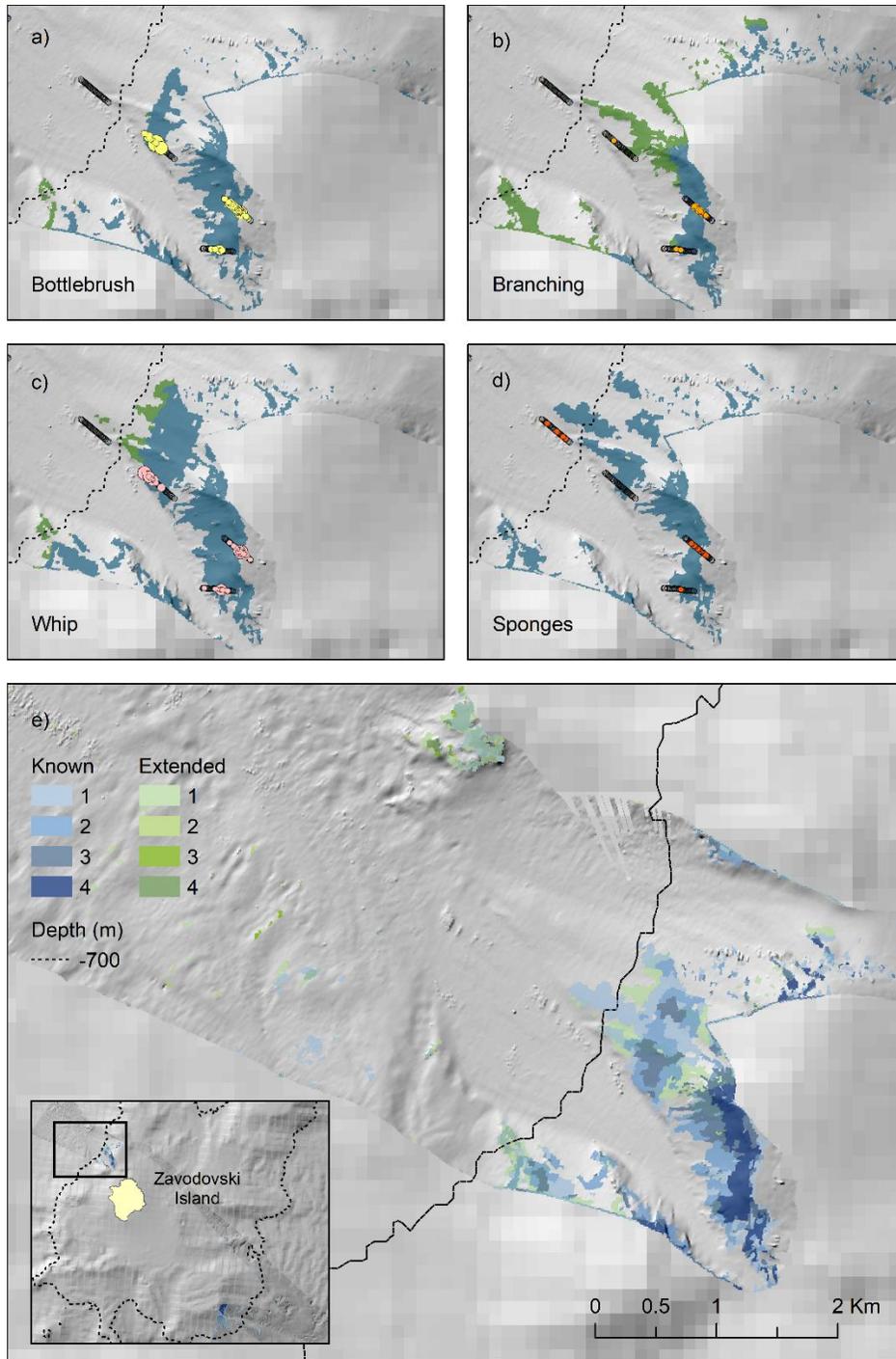
Supplementary Figure 8. Examples of topographic layers derived from MBES bathymetry for the western side of Zavodovski Island.



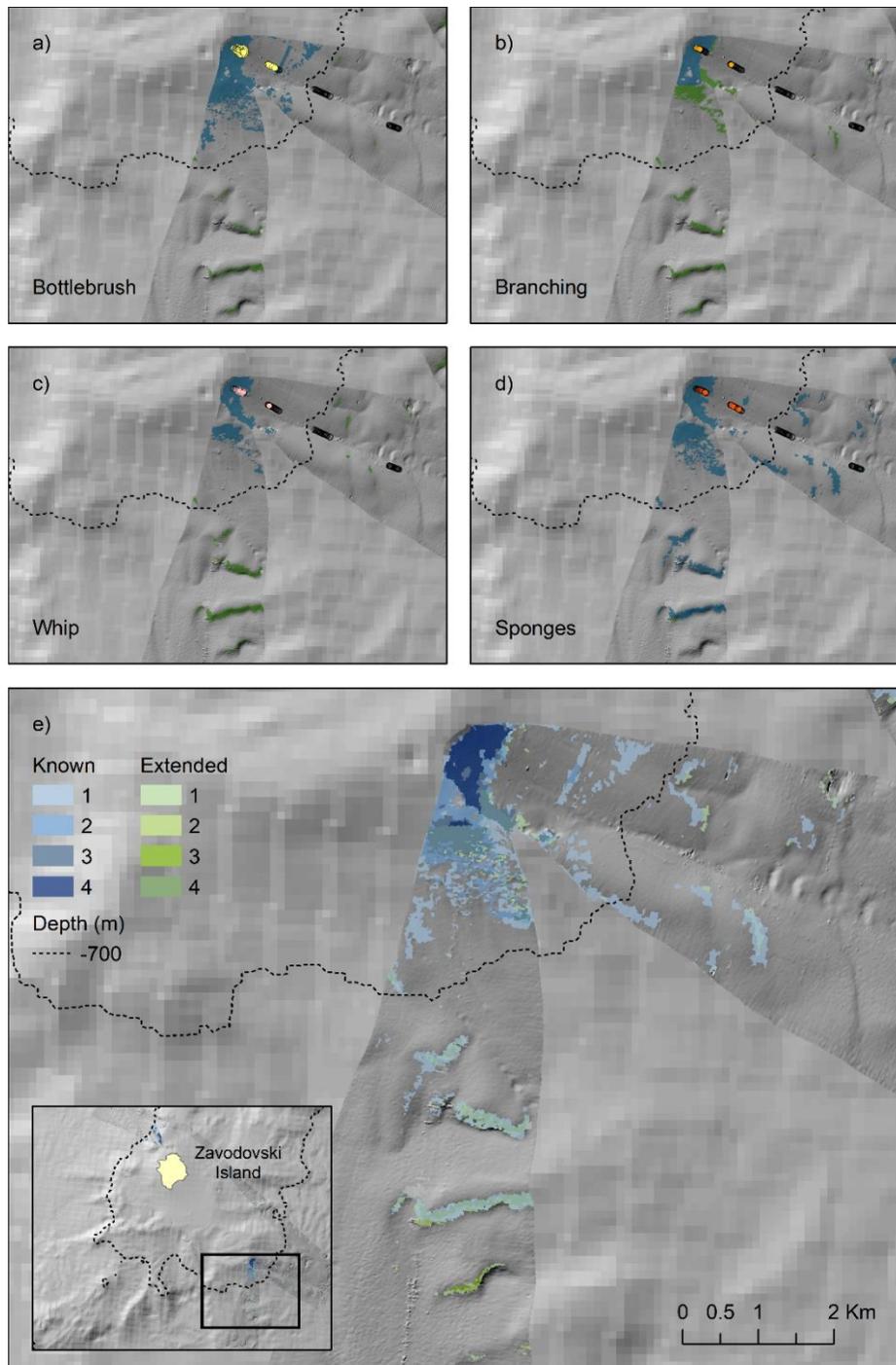
Supplementary Figure 9. Range of depth, slope, annual mean net primary productivity (NPP), number of sea ice days, summer bottom temperature and current velocity at drop camera sampling stations at Zavodovski Island (ZAVO), Saunders Island (SAUN), Montagu Island (MONT), Montagu Bank (MOBA) and Southern Thule (SOTH). Depth and slope were extracted from MBES bathymetry collected during the expedition. Mean NPP, sea ice days, summer bottom temperature and current velocity are extracted from modelled layers described in Hogg et al. (This Special Issue).



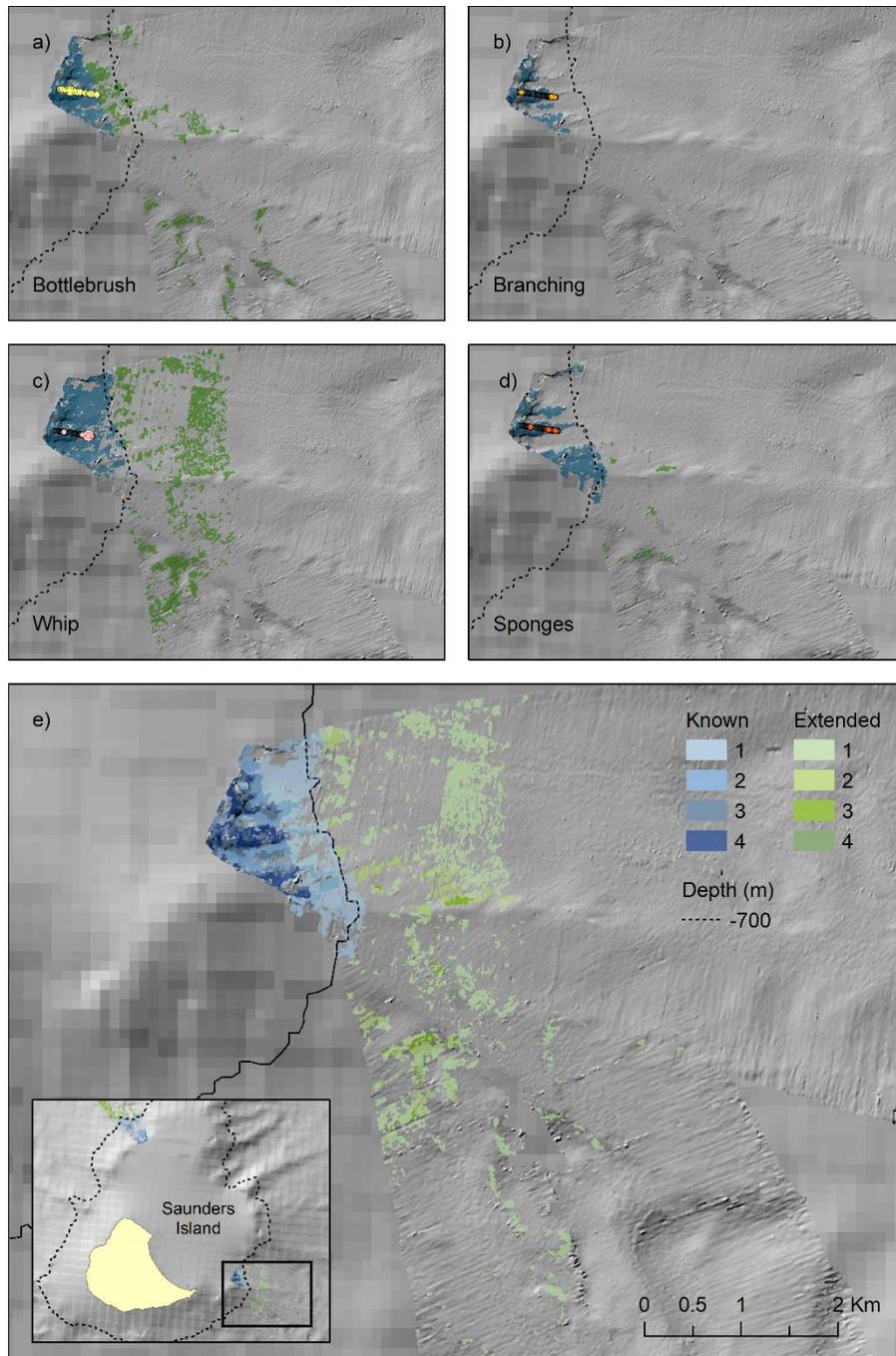
Supplementary Figure 10. Close-up example of the results of the Object Based Image Analysis (OBIA) segmentation used to create maps of potential VME distribution.



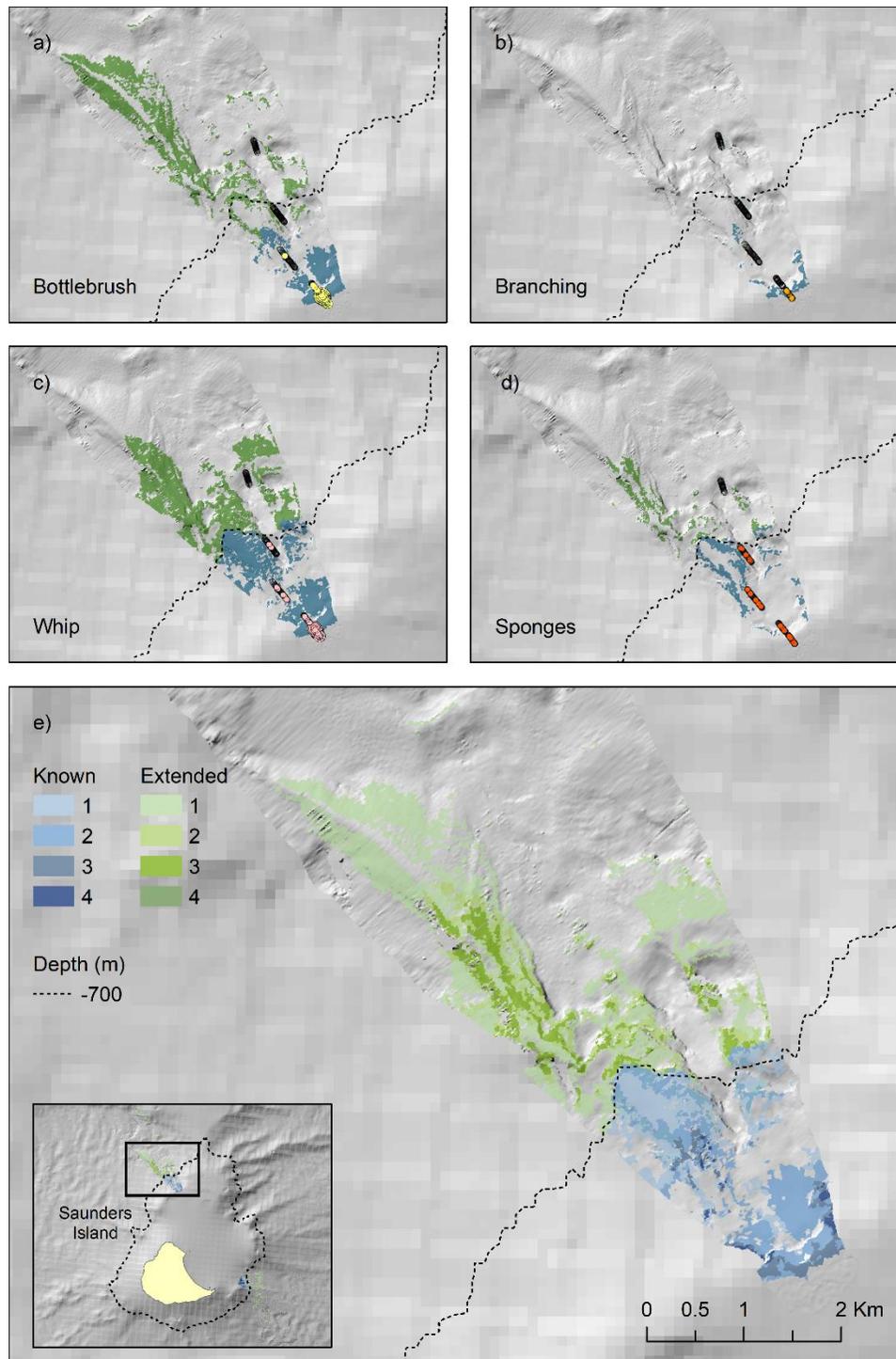
Supplementary Figure 11. Occurrences of VME indicator taxa observed in still images at the survey location north-west of Zavodovski Island, with distribution extrapolated through OBIA to cover the MBES extent for bottlebrush corals (a), branching corals (b), whip corals (c), and sponges (d). Camera transects are denoted by circles with filled circles denoting the presence of VME. The bottom panel (e) shows the number of co-occurring VME taxa predicted. Blue colours indicate the extent within observed depth limit for Zavodovski Island, green colours indicate topographically suitable habitat extended below observed depth (see Material and Methods).



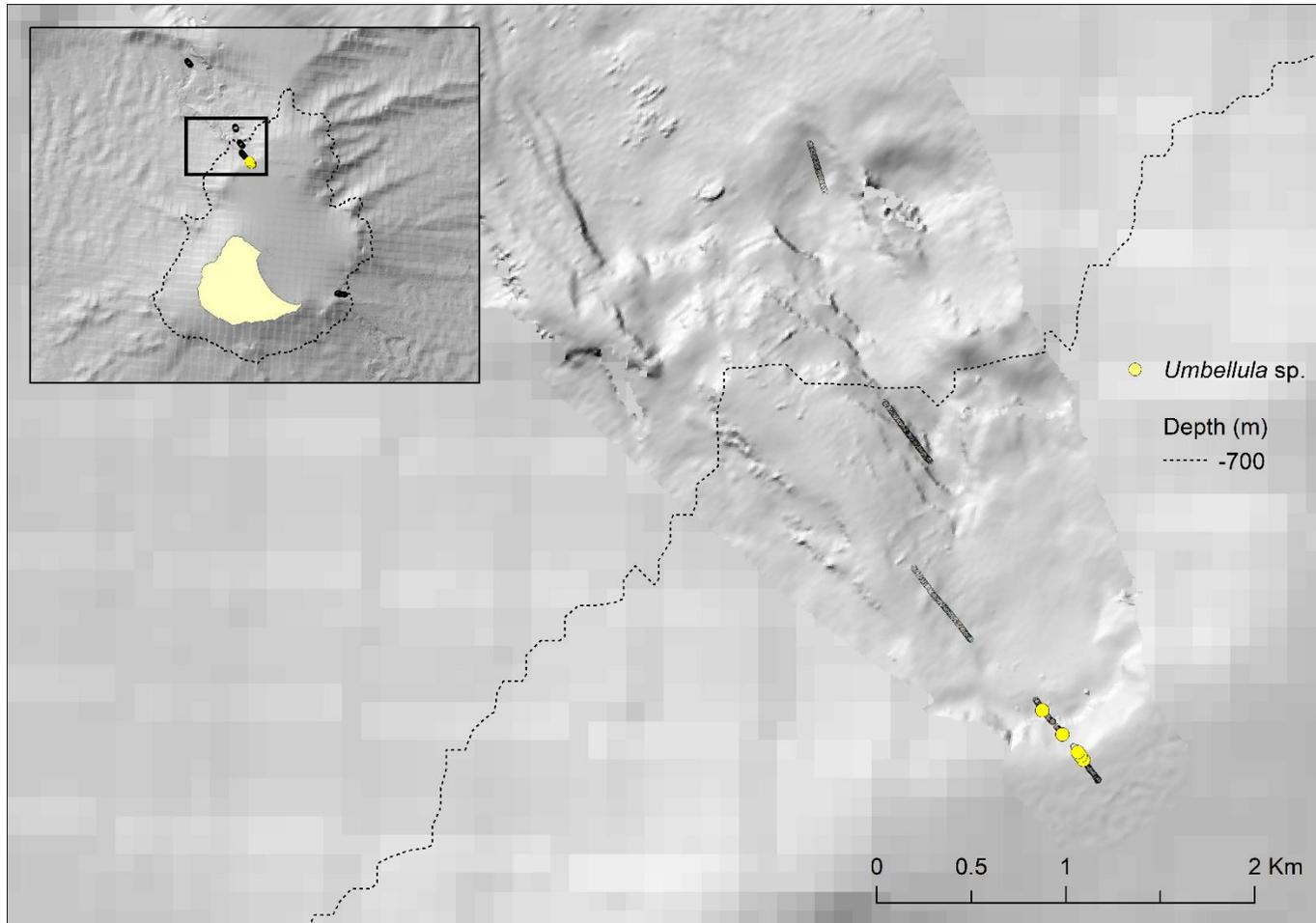
Supplementary Figure 12. Occurrences of VME indicator taxa observed in still images at the survey location south-east of Zavodovski Island, with distribution extrapolated through OBIA to cover the MBES extent for bottlebrush corals (a), branching corals (b), whip corals (c), and sponges (d). Camera transects are denoted by circles with filled circles denoting the presence of VME. The bottom panel (e) shows the number of co-occurring VME taxa predicted. Blue colours indicate the extent within observed depth limit for Zavodovski Island, green colours indicate topographically suitable habitat extended below observed depth (see Material and Methods).



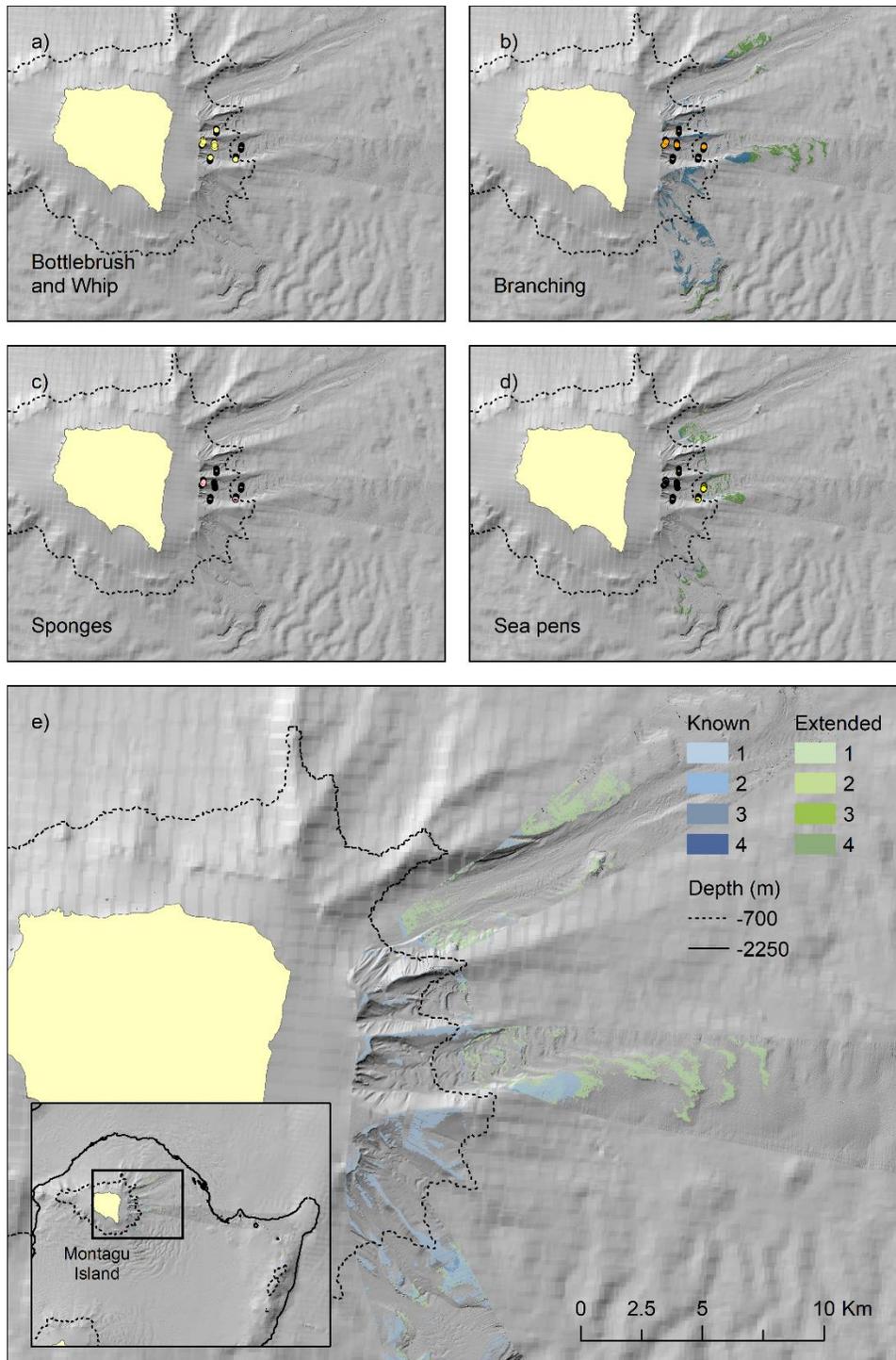
Supplementary Figure 13. Occurrences of VME indicator taxa observed in still images at the survey location west of Saunders Island, with distribution extrapolated through OBIA to cover the MBES extent for bottlebrush corals (a), branching corals (b), whip corals (c), and sponges (d). Camera transects are denoted by circles with filled circles denoting the presence of VME. The bottom panel (e) shows the number of co-occurring VME taxa predicted. Blue colours indicate the extent within observed depth limit for Saunders Island, green colours indicate topographically suitable habitat extended below observed depth (see Material and Methods).



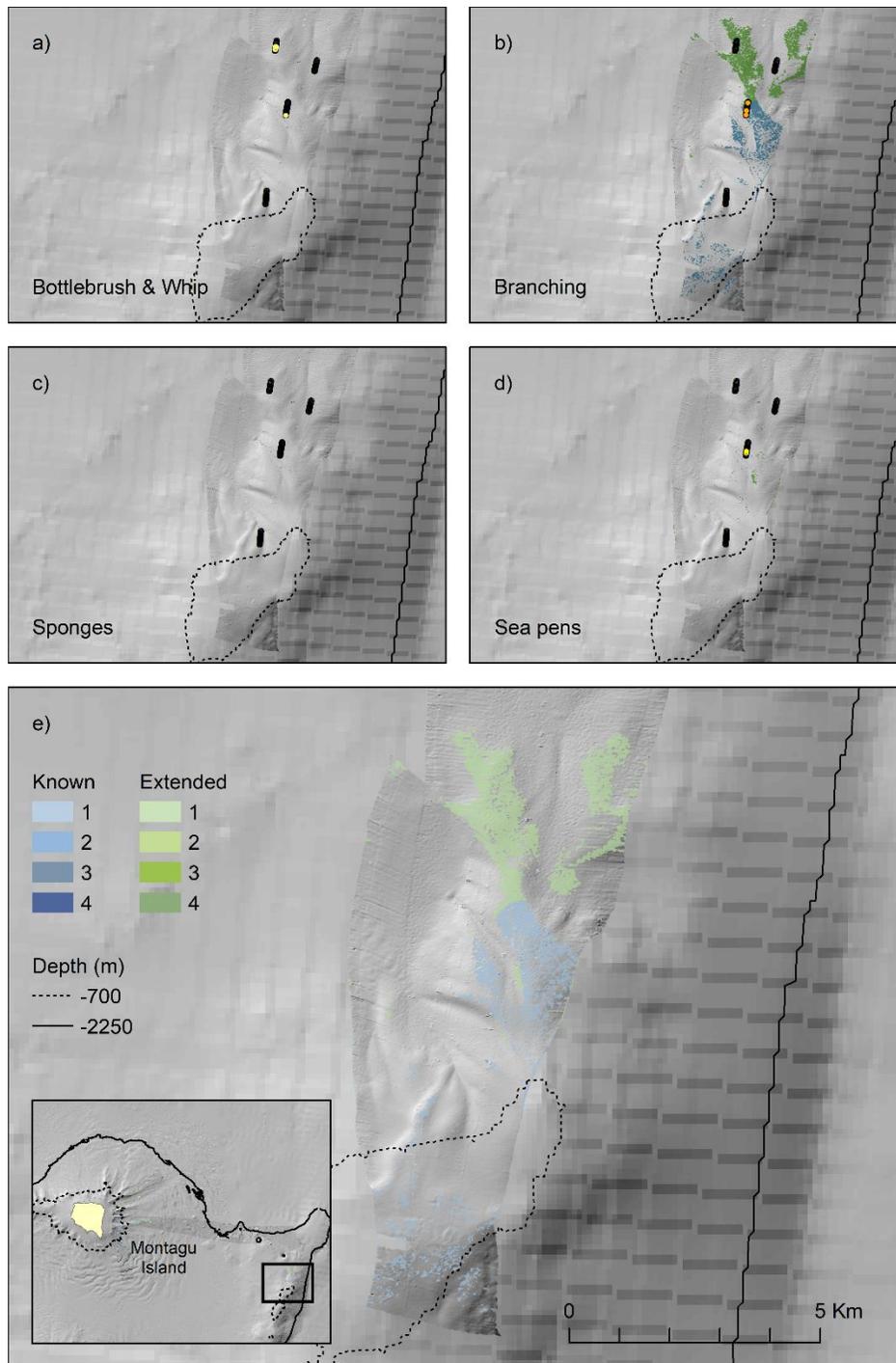
Supplementary Figure 14. Occurrences of VME indicator taxa observed in still images at the survey location north-west of Saunders Island, with distribution extrapolated through OBIA to cover the MBES extent for bottlebrush corals (a), branching corals (b), whip corals (c), and sponges (d). Camera transects are denoted by circles with filled circles denoting the presence of VME. The bottom panel (e) shows the number of co-occurring VME taxa predicted. Blue colours indicate the extent within observed depth limit for Saunders Island, green colours indicate topographically suitable habitat extended below observed depth (see Material and Methods).



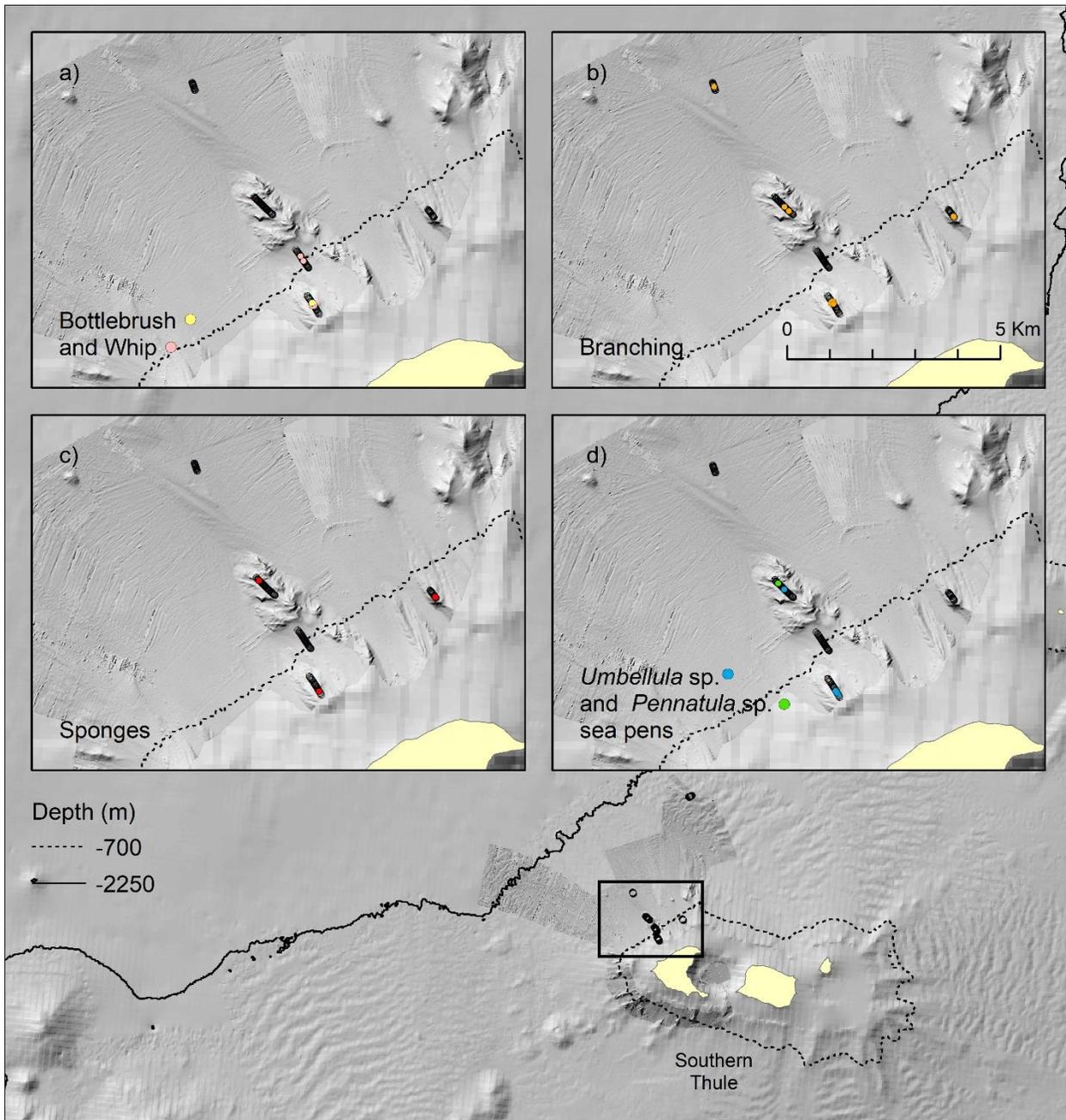
Supplementary Figure 15. Location of still images with *Umbellula* sp. sea pens observed at Saunders Island. Survey sites for which sea pens were not recorded are denoted in black.



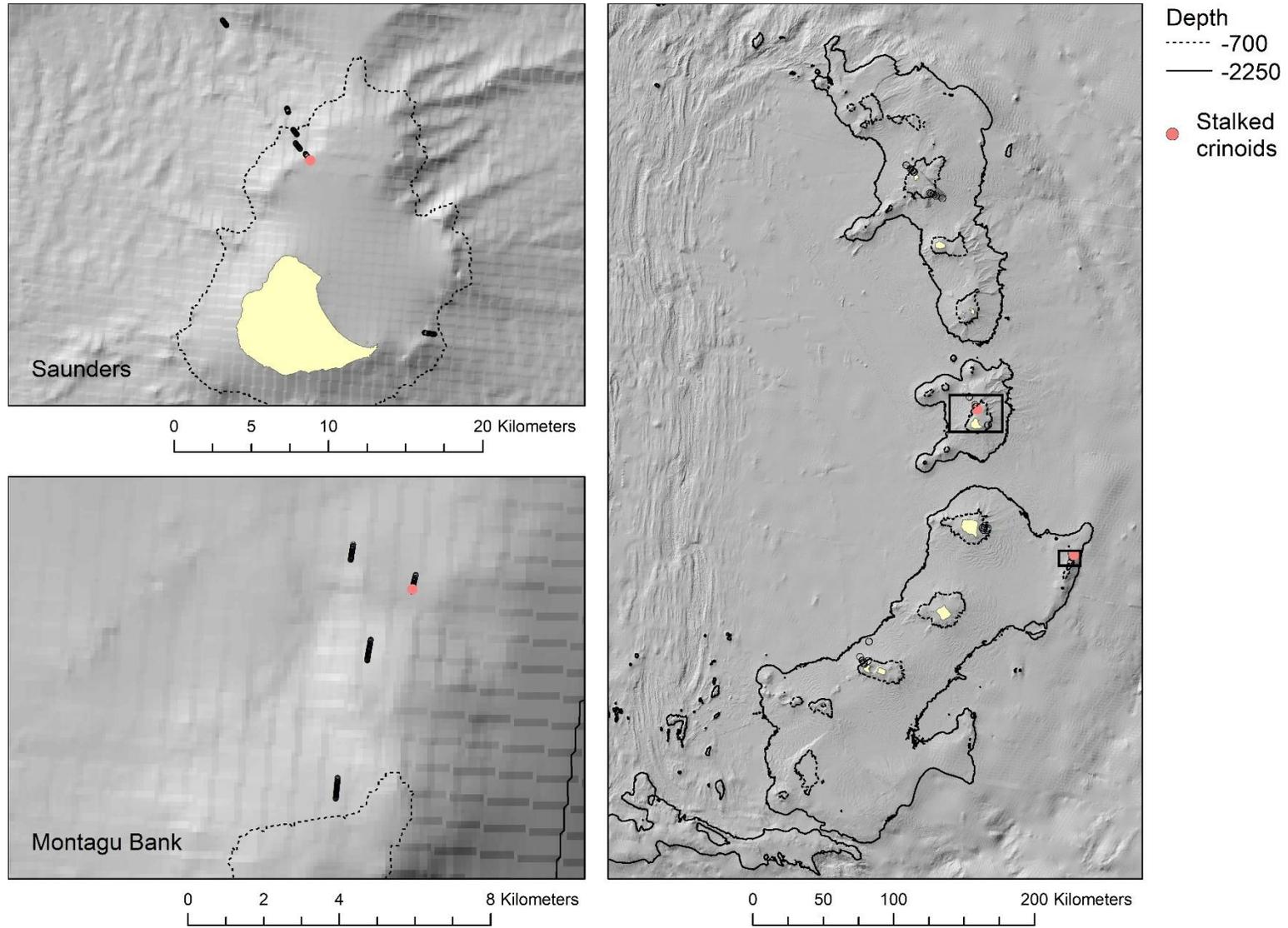
Supplementary Figure 16. Occurrences of VME indicator taxa observed in still images at the survey location on Montagu Island, with distribution extrapolated through OBIA to cover the MBES extent for bottlebrush corals (a), branching corals (b), whip corals (c), and sponges (d). Camera transects are denoted by circles with filled circles denoting the presence of VME. The bottom panel (e) shows the number of co-occurring VME taxa predicted. Blue colours indicate the extent within observed depth limit for Montagu Island, green colours indicate topographically suitable habitat extended below observed depth (see Material and Methods).



Supplementary Figure 17. Occurrences of VME indicator taxa observed in still images at the survey location at Montagu Bank for the bottlebrush and whip corals (a), sponges (b), branching corals (c), and sea pens (d), with distribution extrapolated through OBIA to cover the MBES extent shown for branching Alcyonacea and sea pens. The bottom panel (e) shows the number of co-occurring taxa predicted. Blue colour indicates the extent within observed depth limit for Montagu Bank Island and Bank, green colour indicates topographically suitable habitat extended below observed depth (see Material and Methods).



Supplementary Figure 18. Occurrences of VME indicator taxa observed in still images at the survey location at Southern Thule for bottlebrush and whip corals (a), sponges (b), branching corals (c), and *Umbellula* sp. and *Pennatula* sp. sea pens (d).



Supplementary Figure 19. Occurrences of Stalked crinoids (denoted in pink) in still images at the survey locations at Saunders Island and Montagu Bank. Survey sites for which crinoids were not recorded are denoted in black.