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Amendment to the boundary of Croker Carbonate Slabs Candidate Special Area of Conservation and Site of Community Importance (cSAC/SCI)

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Background

The UK submitted the Croker Carbonate Slabs candidate SAC (cSAC) to the European Commission (EC) in 2012 for the protection of Annex I habitat 'Submarine structures made by leaking gases'; the EC confirmed the site as a Site of Community Importance (SCI) in the same year. The original boundary was drawn to include 8km^2 (800 ha) of the Annex I feature "submarine structures made by leaking gases" (Figure 1).

Previous surveys in (Whomersley *et al*, 2010; Judd, 2005) confirmed the existence of MDAC in the site. Acoustic data indicated blocks of MDAC up to 2m in height, platforms up to 2km long by 500m across and a cliff structure 6-8 m high . Survey of this area found cemented rocks providing a firm substrate for a diverse range of fauna. Chemical analysis of carbonate samples collected during this survey indicated they were methane-derived and thermogenic in origin.

Additional survey work undertaken in 2008 (Whomersley*, et al*., 2010) further established the presence of MDAC over a wider area. The feature was mapped using high resolution acoustics (multibeam echo-sounder and sidescan sonar) and validated using seabed imagery and grab samples. Within the site, the MDAC structures took two key forms, extensive MDAC 'pavement' or 'slabs' up to 20mm thick (termed 'low relief ' MDAC) and larger structures over 20mm thick and up to 2m high (termed 'high relief' MDAC). The exposed MDAC was observed forming two longitudinal features with a SSW-NNE orientation.

Proposed boundary amendment

The proposed boundary amendment (Figure 2) extends the site boundary to the North East, North West and South West of the existing boundary following a contiguous area of Annex I habitat known as MDAC[1] (approximately 55km^2 (5500ha)) identified through surveys undertaken in 2012 and 2013. The proposed revision to the boundary encompasses a large area of MDAC to the East of the previously mapped extent, together with smaller patches of MDAC to the South West. The western boundary of the site follows the median line between the offshore waters of the UK and the Republic of Ireland. Following JNCC's UK SAC boundary guidance, the boundary includes a buffer zone of ~240m around the known extent of MDAC, based on a fishing warp ratio of 3:1 using the average depth of the seabed (80m) (JNCC 2008). This buffer was manually adjusted to give a 300m buffer in the southern part of the site where the feature occurs in deeper waters (~100m on average).

New evidence

Evidence to support an amendment to the site boundary comes from the 2012 and 2013 surveys of the regional Marine Conservation Zone (MCZ) project recommendation North St Georges Channel recommended MCZ (rMCZ)[2], which overlaps the full extent of the Croker

[1] Methane-derived authogenic carbonate forms when methane is released from the seabed and reacts with water. Further information on Annex I Submarine structures made by leaking gages is available here: www.jncc.gov.uk/page-1453

[2] This site was recommended as part of the Irish Seas Conservation Zones Project but has not been designated a MCZ.

Carbonate Slabs cSAC/SCI (Defra, 2013). The surveys collected multiple ground-truthing samples within and around the existing site boundary for the cSAC/SCI.

This was an MCZ verification survey which focussed on MCZ features[3] only and any data collection relating to the occurrence and extent of MDAC was opportunistic. The survey products focussed on identifying and mapping the extent of MCZ features, particularly broad-scale habitat features. MDAC forms a hard layer on the seabed supporting biological assemblages similar to rock habitats. Consequently the data that indicate the presence of MDAC, were classified into the broadscale habitat 'Moderate energy circalittoral rock'. The survey found that 'Moderate energy circalittoral rock' was most 'evident in the vicinity of the Croker Carbonate Slabs cSAC/SCI and concluded that this is most likely to represent MDAC' (DEFRA, 2013). The rMCZ site report suggests that approximately 55km^2 of continuous MDAC (classified by employing bathymetric roughness used in conjunction with classified ground-truthing samples) occurs within and surrounding the existing site boundary (DEFRA, 2013). Surveying within and around the cSAC/SCI collected fourteen sediment samples for Particle Size Analysis, together with multiple video tows to record surface information. Over 200 images from ~40 stations (shown in Figure 3) contained circalittoral hard substrata, with 16 of the video tows classified as 'Moderate energy circalittoral rock'.

Full coverage of acoustic multibeam bathymetry and backscatter data was gathered as part of the North St Georges Channel rMCZ survey. Figure 4 shows these data align with the acoustic data collected in 2004 & 2008. High and low relief MDAC features can be seen clearly in the multibeam data, with patches of seabed showing a similar acoustic signature extending outside of the existing site boundary. These acoustic data suggest a continuous layer of MDAC extending to the north east of the current SCI boundary, and the existing features extending to the south west and south east. These multibeam sonar data in combination with ground truthing data have been used by Cefas to generate a broad scale habitat map of the region that shows approximately 55km^2 of hard substrate. These patches of hard substrate were analysed and it was concluded that this was very likely to be MDAC based on previous data collected from within the Croker Carbonate Slabs cSAC/SCI.

In 2015, JNCC in partnership with Cefas undertook a monitoring survey (Wood *et al*., 2016) of Croker Carbonate Slabs cSAC/SCI that collected samples from within and surrounding the existing site boundary where a survey of North St Georges Channel rMCZ indicated the presence of hard substrate in the area. Preliminary analysis of samples collected in 2015 support the presence of MDAC outside the existing site boundary within the area of the proposed extension to the site boundary.

[3] The MCZ Feature catalogue is available on the JNCC website here http://jncc.defra.gov.uk/page-4527

Figure 1: Original boundary of Croker Carbonate Slabs cSAC/SCI.

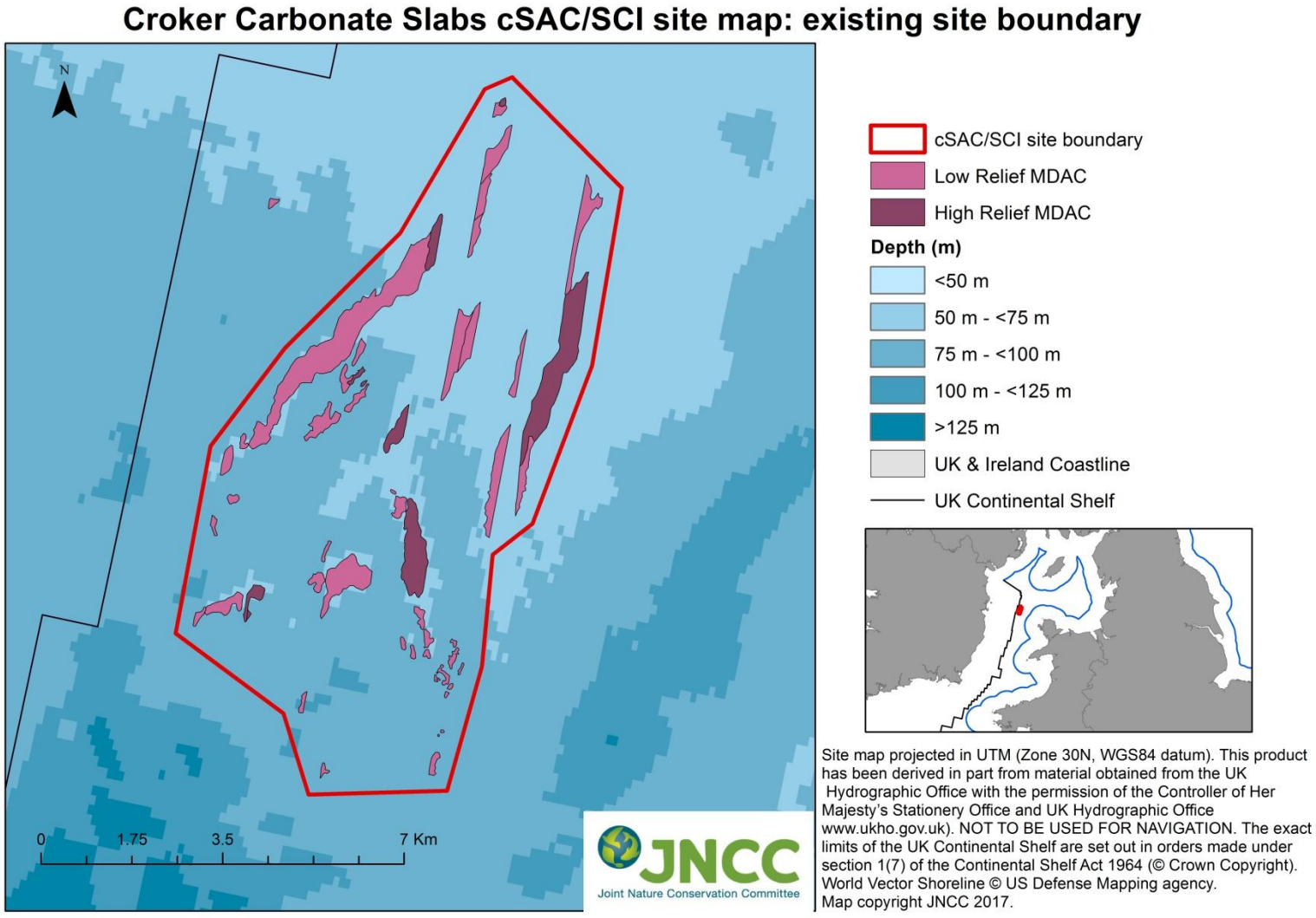


Figure 2: Proposed boundary amendment and revised habitat map from 2012/2013 surveys for Crocker Carbonate Slabs cSAc/SCI.

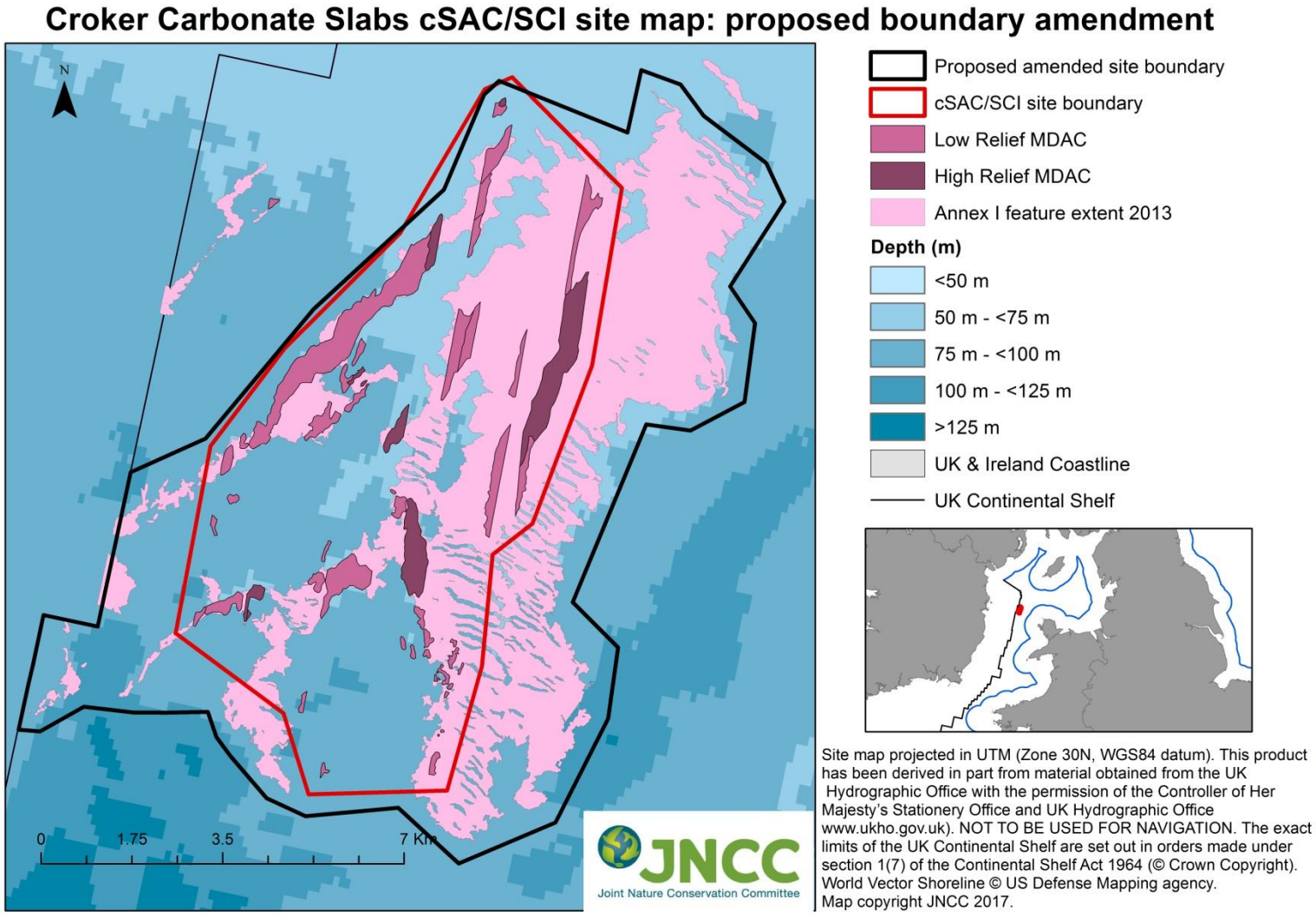


Figure 3: the distribution of mapped hard substrate, MDAC and the location of biological sampling undertaken.

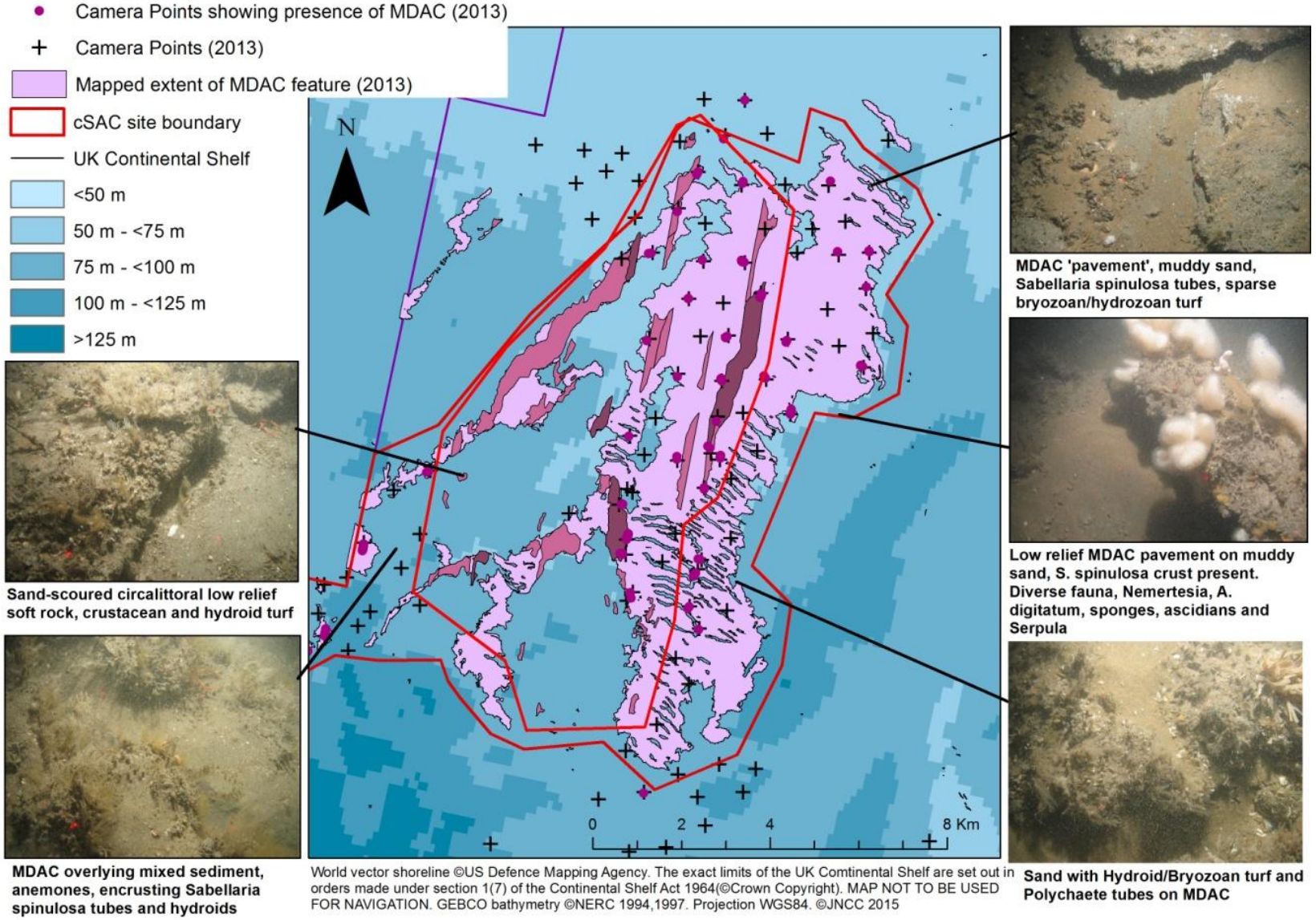
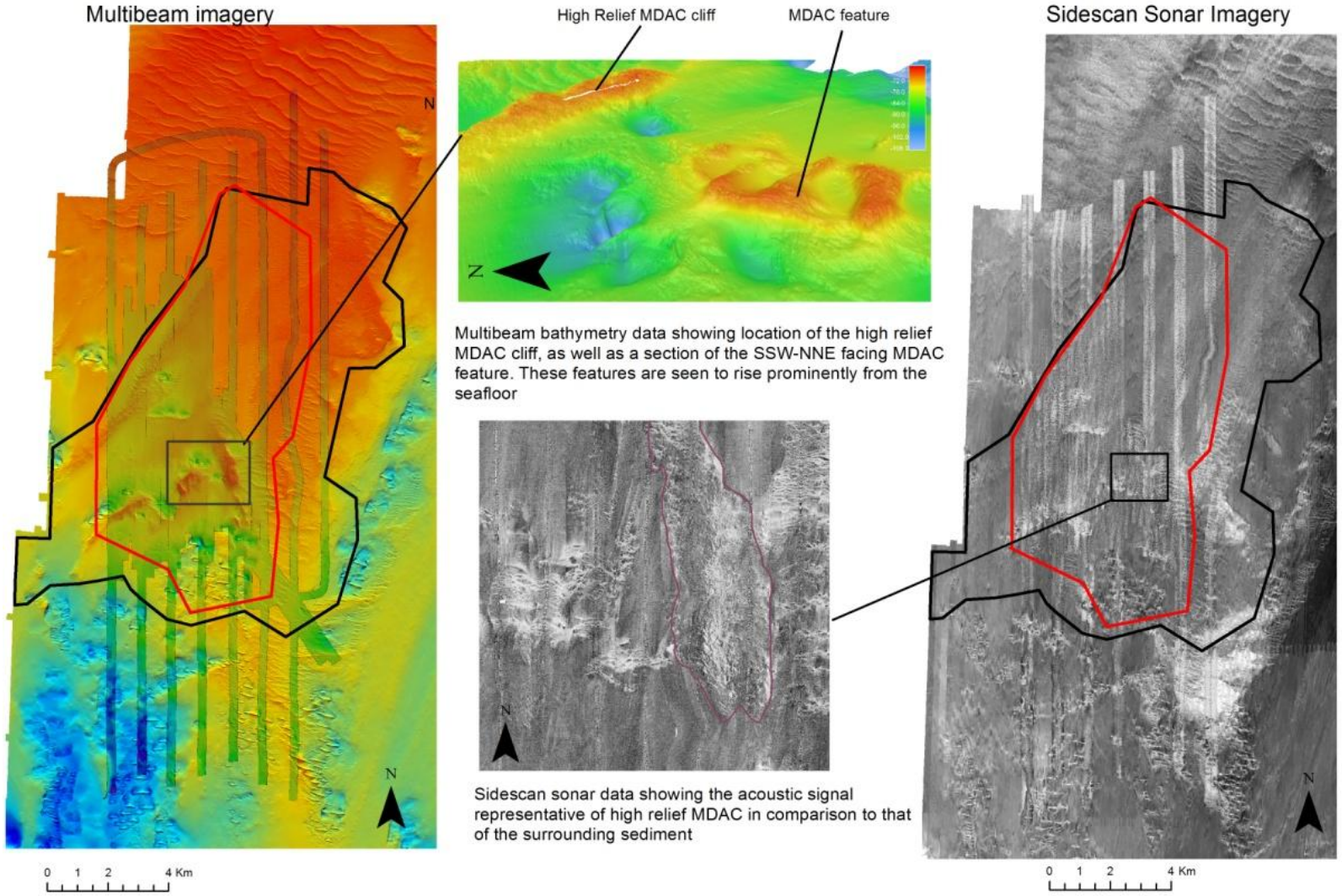


Figure 4: Acoustic data (2004, 2008 & 2013 surveys) showing imagery of seabed and example area of methane-derived authigenic carbonate (MDAC) (with purple outline) delineated from sidescan sonar data.



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