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Supporting Information for

Embryonic rifting zone revealed by a high-density survey on the southern margin of the southern Okinawa Trough

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Introduction

We present here second-order information on the figures in this study.

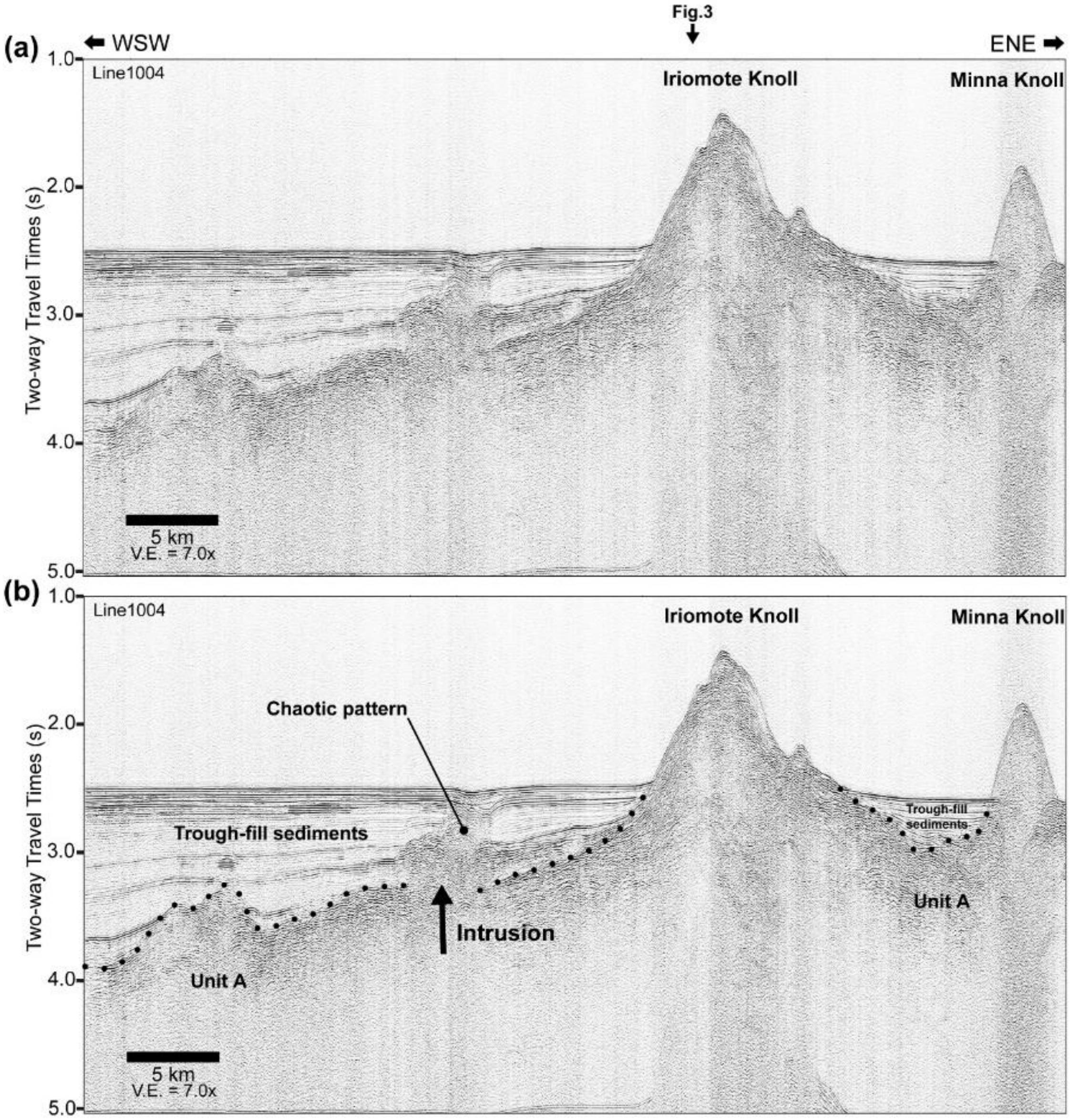


Figure S1. **Stacked seismic profile in the Okinawa Trough. (a)Uninterpreted profile MCS Line1004. (b) Interpreted MCS Line1004. Several intrusive structures that penetrate the Unit A have been developed in the trough-fill sediments of the OT. However, the boundary between the Unit A and the intrusive structure is unclear. The locations of the profiles are shown in Fig. 1b. Dotted line in the interpreted profile indicates the unconformity surface. VE is calculated using Vp = 1,500 m/s.**

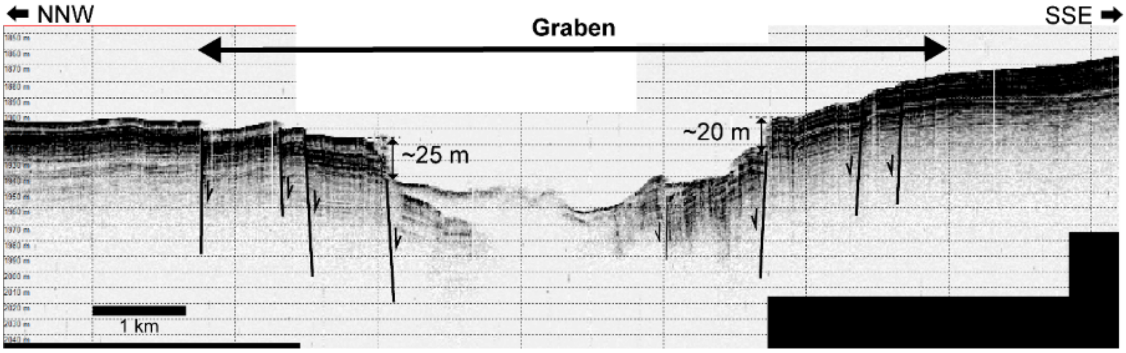
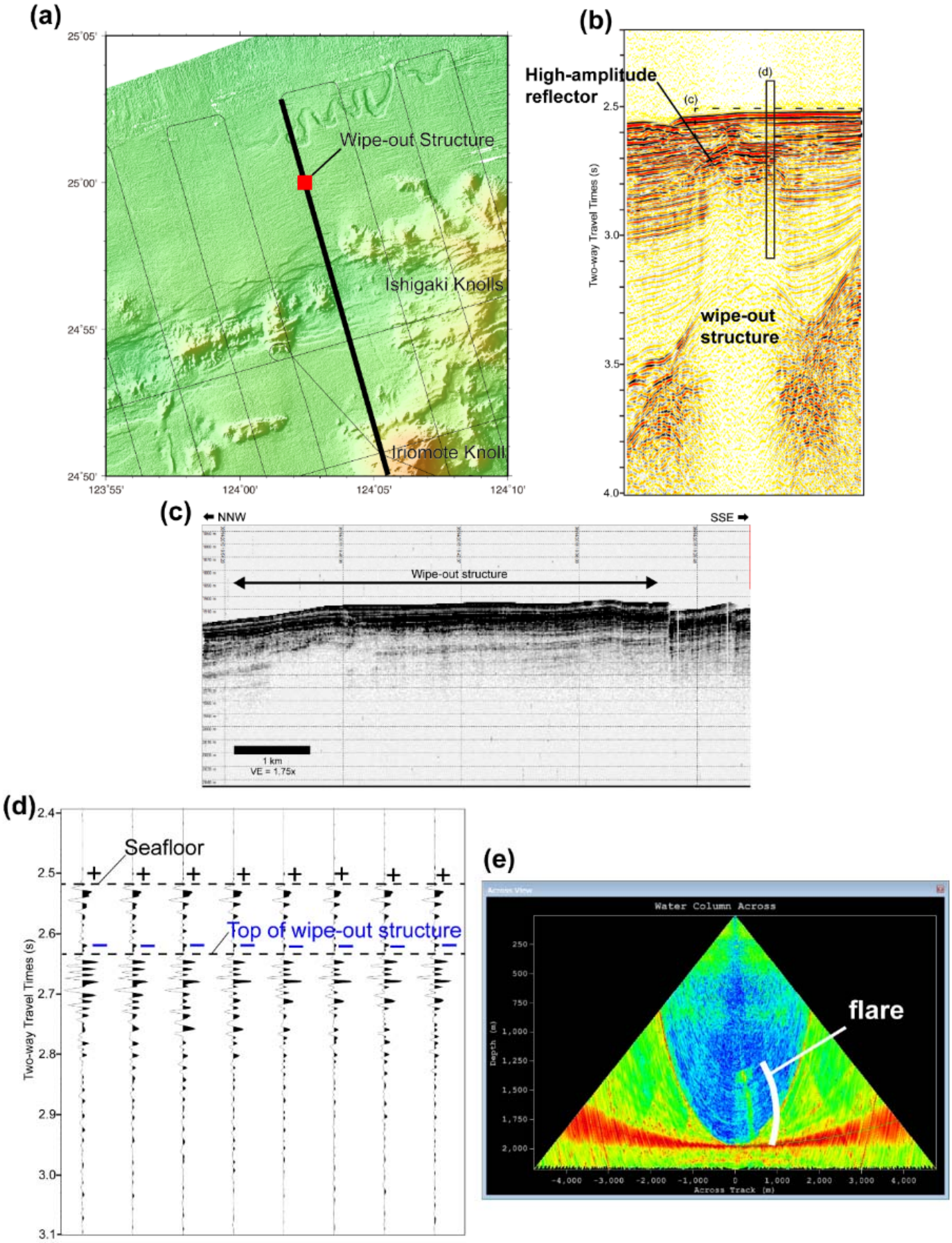


Figure S2. Detailed sub-bottom profile across the Graben. Since this profile was acquired at the same time as the seismic reflection survey, it was acquired at the same position as Line42 in Fig. 3. This data was acquired using Parasound P70 parametric sub-bottom profiler (*Atlas Hydrographics*). The fault displacement of both the northern and southern bounding faults can be clearly estimated in this profile. The maximum depth of the graben is ~60 m in this profile. VE is calculated using Vp = 1,500 m/s.



FigureS3. Seismic profiles across the wipe-out structure. (a) Detailed bathymetry map around the wipe-out structure. (b) Enlarged seismic profile across the wipe-out structure (line42). (c) Detailed sub-bottom profile across the wipe-out structure (line42). (d) Seismic data illustrating waveforms associated with the wipe-out structure. (e) Image of the acoustic water column anomaly showing a flare rising from

the seafloor. The gas and/or fluid, which moved through the trough-fill sediments as the wipe-out structure, converges on the high-amplitude reflector observed by Fig. S3b. However, in sub-bottom profile (c), no structure such as a fault is observed in the shallowest part of the trough-fill sediments. Therefore, it is presumed that the fine structure that cannot be captured by the sub-bottom profile in the trough-fill sediments moves as a pass and erupts at the seafloor. The + and – symbol in Fig. S2b is indicate the polarity of the seismic wave; + indicates a positive polarity, – indicates a negative polarity.

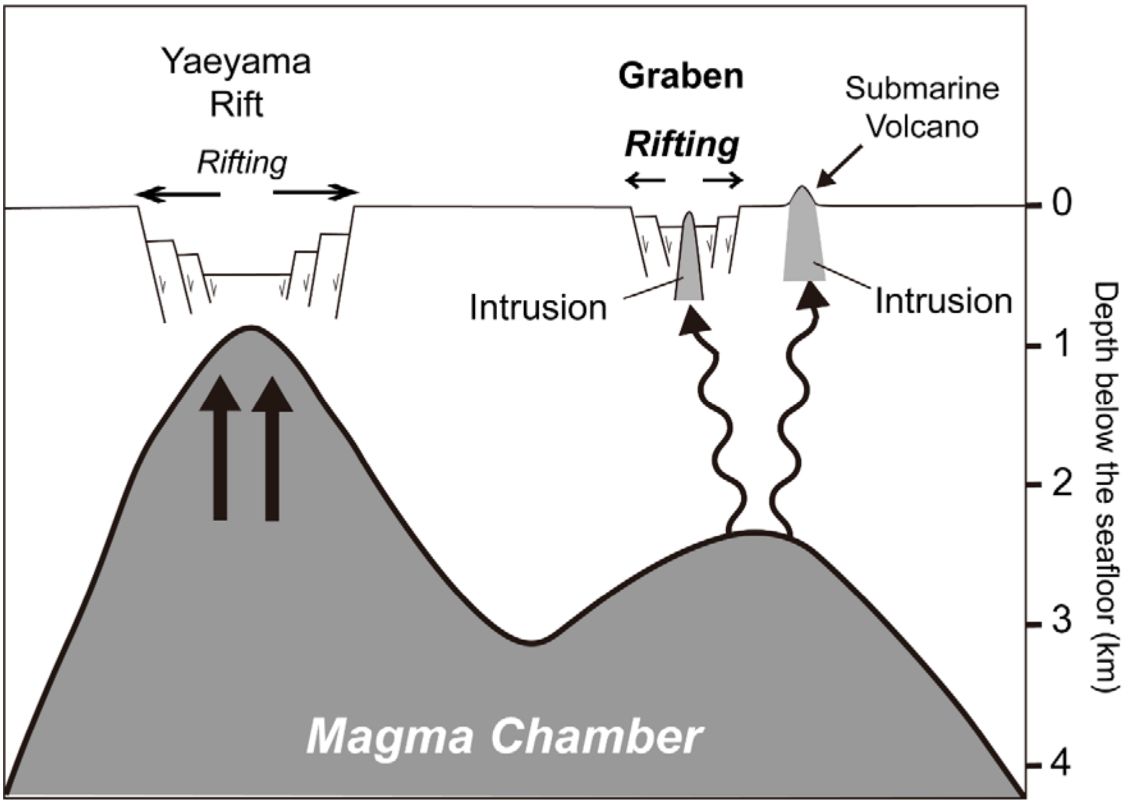


Figure S4. Tectonic model of the area offshore northern Ishigaki-Jima Island. Regarding the depth of magma intrusion at the Yaeyama Rift, we used the interpretation of Arai et al. (2017). At the Yaeyama Rift, the magma penetrates just below the seafloor (Arai et al., 2017). On the other hand, in the Graben reported in this study, it is considered that the Graben is formed due to the formation of the magma chamber acting the heat source at a depth of 2-3 km. In addition, it is considered that the origin of magma originates from the same magma chamber as the Yaeyama Rift in consideration of the results of Arai et al. (2017).