

## ***Interactive comment on “Transition from hydrothermal vents to cold seeps records timing of carbon release in the Guaymas Basin, Gulf of California” by Sonja Geilert et al.***

### **Anonymous Referee #2**

Received and published: 1 May 2018

The manuscript bg-2018-12 by Geilert et al. reports geophysical and geochemical observation at the Guaymas Basin. Authors collected seismic dataset and porewater/seawater geochemistry at/above the hydrothermal vent and cold seep sites and interpreted them to discuss temporal transition of the magmatic activity.

I do not recommend the manuscript to be published on BG because of three major concerns. First, spatio-temporal scales are mismatched between geophysical and geochemical datasets collected. Particularly, spatial coverage of geochemical profiles collected is quite limited to discuss basin-scale phenomena suggested by seismic observation. Such limited evidence allows frail interpretation to reveal general characteristics

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of the seep and vent sites. Second, construction of the manuscript is complicated, and I cannot catch the main story. Separation of what this study actually achieved from the achievements in previous studies (Lizarralde+ 2010 and Berndt+ 2016) is unclear. Third, as I read, main focus of this study is not biogeoscience. It seems geological and/or geochemical study because major purpose of this study is to characterize subseafloor geology/geochemistry and to bridge them. Although microbial activities of methane production/consumption are discussed, it is not main story of this study. Specific comments are presented below.

L001: I think more specific wording describing what authors observed seems better.

L021: This sentence seems inadequate as abstract of this study.

L024: In a research field for hydrothermal activity, horizontal distance of ~500m is not "close". See Cruse&Seewald 2006; 2010; Reeves et al. 2011; Baumberger et al. 2016; or some other numerous papers.

L040: Introduction, carbon flux from seafloor to atmosphere, is not closely related to what authors observed in THIS study.

L051: This paragraph can move to M&M.

L069: What is environmental conditions?

L071: Magmatic intrusion is geological process while fluid-rock and fluid-sediment interactions (associated with magmatic heat) influences fluid/sediment geochemistry. Because major part of this study is geochemical description, it seems better to make the wordings clear.

L075: These sentences (L075-082) seem inadequate for this study.

L097: Authors do not clearly state whether seismic data is acquired in this study or not. Clarify it.

L125: Microbial mat is adequate.

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L131: I feel the names of samples seem confusing. Rename of the samples based on geological or geochemical properties, such as North Seep site samples (NS01, NS02, NS03) and smoker site (SM01), seems better for readers.

L137: immediately "subsampling"

L139: Please show a reference for pressure filtration.

L141: What is difference from core retrieval in L137?

L144: Please show a reference for centrifugation.

L150: Purpose of temperature and conductivity measurements is unclear.

L167: Names seem confusing.

L208: MAT 253?

L217: What was the sample analyzed?

L255: Purpose of biomarker measurements is unclear.

L292: Please show (raw) vertical profiles of temperature in addition to (processed) heat flow values in figure 3 or figure 4.

L384: Is the water column chemistry already reported in Berndt et al. 2016? Is it first reported in this study? Please clarify it.

L415: 4.2? 4.1?

L418: Is it from Berndt et al. 2016?

L425: Because horizontal distribution of heat flows are highly heterogeneous at around high-temperature vents, such comparison may make no sense.

L446: Is this hypothesis supported by previous observations at sedimented hydrothermal vent sites?

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L455: Fig4?

L491: I guess chemical reactions between sediment and intruded sill occur only at the time of eruption event. Fluid-sediment interaction associated with magmatic heat source occurs more likely. See Cruse&Seewald 2006 GCA, Ishibashi et al. 2014 Geochem.J, or some other papers reporting fluid geochemistry of sediment-covered vent sites.

L599: The story of timing of methane release seems frail due to limited evidences for temporal scaling. Information about time is only derived from solid phase (carbonate geochronology and sedimentation rate), and no evidence about past methane release is presented. Although past intrusion into sediment suggested by seismic dataset may imply generation and release of thermogenic methane at the time of intrusion, it is just interpretation.

L703: This is not conclusion of this study.

L712: This interpretation has been clear before this study and is not proved in this study.

Fig1: Not informative. Except DSDP site and zoom up for seep-vent sites are better.

Fig3: Y-axis scaling is not good. Using two panels for large and small heat flows is better.

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