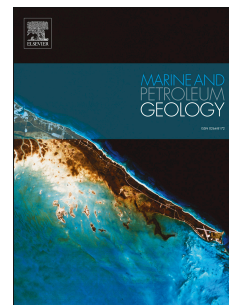


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Large salt accumulations as a consequence of hydrothermal processes associated with 'Wilson cycles': A review Part 1: Towards a new understanding

Martin Hovland, Håkon Rueslåtten, Hans Konrad Johnsen



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1 **Large salt accumulations as a consequence of**
2 **hydrothermal processes associated with ‘Wilson cycles’: A**
3 **review**
4

5 **Part 1: Towards a new understanding**
6

7 Martin Hovland*¹, Håkon Rueslåtten², and Hans Konrad Johnsen²

8 ¹ Tech Team Solutions, Stavanger, Norway

9 ² Independent consultant, Trondheim, Norway

10 *Corresponding author

11 **ABSTRACT**

12 The formation of large salt deposits is observed especially in areas with a geological history
13 of high tectonic activity. Over the last decade it has become a well-established fact that heavy
14 brines form and solid salts precipitate, due to the thermodynamic and physico-chemical
15 properties of seawater at high temperatures and pressures encountered within hydrothermal
16 systems. This article reviews the modern theoretical and experimental research behind these
17 findings, and also describes geological settings that most likely cause brine- and salt-forming
18 hydrothermal processes to occur. This analysis has led to the identification of a set of specific
19 conditions, properties, and processes (referred to as *Conceptual elements*) that are used to
20 explain the often complex processes of brine behavior that leads to hydrothermal formation of
21 solid salt.

22 The objective of this review is to present hydrothermal conditions known to occur during
23 Wilson cycles: subduction, collision, and rifting, e.g., zones of repeated tectonic unrest, where
24 brines (commonly derived from seawater) are concentrated into heavy brines and precipitate
25 solid salts. The internal heat of the Earth and its interaction with deeply-circulating seawater
26 in hydrothermal systems and also the immense recycling of crustal materials, including
27 porous oceanic crust and serpentinite (hydrated) rocks via mantle processes may lead to the
28 formation of salt accumulations. It is also acknowledged that such brines and solid salts may

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