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## **Small gesture, big effect! Investigation of the role of gestures in teaching plate tectonics through an eye tracking experiment!**

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Many geoscience phenomena cannot be observed directly because they take place in huge time and place scales. According to conceptual metaphor theory [1] we need to build analogies to understand geoscience phenomena which we cannot perceive directly. Conceptual metaphor theory has been used in geoscience education research for analysing students' conception of trade winds [2] and glaciers [3]. In both research projects students' speech has been analysed to understand how students use every day experiences to understand geoscience phenomena. Herrera and Riggs [4] and Conrad [5] analysed in addition students' gestures to identify analogies used by participants to understand sedimentary processes [4] respectively plate tectonics [5] and could demonstrate how gestures could be used as a window to student's cognitions. While there is little research on understanding students' conception by analysing gestures, the role of gestures in teaching situations in geoscience education research has not yet been examined.

This presentation focuses on the impact of gestures on the effectiveness of teaching processes which occur at constructive and destructive plate boundaries. Two student groups were presented with the same movie about plate tectonics, the only difference between both groups being that the teacher within the movie seen by one group accompanied explanations with gestures which aims the activation of appropriate metaphors for understanding geoscience phenomena. After instruction the participants have been interviewed about their conceptions of constructive and destructive plate boundaries. Interviews have been analysed with a combination of qualitative content analysis [6], systematic metaphor analysis [7] and an analysis of gesture. In addition, students' gazes while watching the teaching movie have been recorded by a remote eye tracker. The research questions have been:

1. Do students perceive teachers' gestures during the explanation of processes at convergent and divergent plate boundaries?
2. Do gestures improve teaching while explaining processes at convergent and divergent plate boundaries?

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