Many structures and processes related to geoscience cannot be perceived directly because of their spatial and temporal dimensions (Conrad, Basten & Felzmann, 2014). According to the theory of experientialism (Lakoff & Johnson, 1980; Johnson, 1987; Lakoff & Johnson, 1999), they can only be understood on an imaginary level. Especially for topics, which can only be understood with the help of metaphors and analogies, embodied conceptions are adequate source domains in order to foster scientific correct conceptions (Niebert, Marsch & Treagust, 2012). According to this, theory of experientialism should play a key role for the development of teaching strategies for geoscience topics. Nevertheless, there has been little research in geoscience education to date using the theory of experientialism systematically (Basten, Conrad & Felzmann, 2013). In the research project being presented, the theoretical framework is based on the theory of experientialism. The model of educational reconstruction (Duit, Gropengiesser, & Kattmann, 2005; Reinfried, 2007) was used to develop didactical guidelines for teaching plate tectonics in geography class.

Students’ conceptions of plate tectonics have been investigated by using qualitative interviews (Witzel & Reiter, 2012). I analyzed these interviews with a combination of qualitative content analysis (Krüger & Riemeyer, 2014), systematic metaphor analysis (Schmitt, 2005; Niebert, 2010) and systematic analysis of gesture (Müller, 1998; Herrera & Riggs, 2013). By these means, I could identify students’ central conceptions as well as the source domains used by students to construct these conceptions. In addition, I examined the central term ‘Platte’ (Engl. ‘plate’) using cognitive linguistic analysis in order to identify difficulties using the basis category ‘plate’ as a source domain for understanding tectonic plates. For scientific clarification, three textbooks (Grotzinger, Jordan, Press & Siever, 2008; Tarbuck & Lutgens, 2009; Frisch & Meschede, 2011) and one scientific paper (Höink, Jelinek & Lenardic, 2011) were analyzed with a combination of qualitative content analysis and systematic metaphor analysis. The comparison of scientific and learners’ perspectives led to the development of educational guidelines for teaching plate tectonics with a focus on the activation of eligible embodied sources (Niebert et al., 2012).

The lecture focuses on the investigation of students’ perspectives. Key results of the interviews will be presented as well as the methodology of analyzing students’ speech and gestures. Additional educational guidelines for teaching plate tectonics effectively will be presented.