The goal of this thesis is to design, develop and evaluate a ‘User-Centered Design’ (UCD) approach to sonification. I implement the methods and tools using meteorological climate data as an exemplar. Climate data is an ideal model domain for a number of reasons including the typically large multivariate data sets, the dynamically changing time-based nature of the data, and the complex nature and process of creating models. My hope is to develop a method in which sonification provides a desired and useful tool for climate scientists. Furthermore, the timely issue of climate change, and the general familiar nature of aspects of terrestrial climates make sonification potentially useful and attractive to a wide general audience.

Researching how to give attention to the users' behavior in each stage of the design and development and understanding how the users' learning curve looks like is a substantial part of this thesis. In addition to functionality and usability, pleasure of the user is also a central goal in designing the application. Moreover, there are specific tasks in specific domains with specific data that could be more suitable to explore using auditory feedback in addition to the common visual ones. To conclude, my research questions in the above mentioned three categories (UCD, aesthetics of sonification, and visualization) include:

1. How could user centered design process improve sonification?
2. What are some HCI (human–computer interaction) design patterns suitable for the domain of audio and sonification?
3. How to design aesthetically appealing sonic interfaces without missing on usability and functionality?
4. How could sonification complement visualization?
5. What are some data analysis tasks that could benefit from sonification?

To this point, state of the art in sonification and HCI is reviewed. Data about the workflow of the climate scientists are gathered (using Contextual Inquiry and Focus Groups.) Furthermore user goals and their language metaphors are investigated in order to map them to sonic metaphors. The next steps are building a sound space and mapping sounds to climate metaphors for the auditory display in an iterative approach.