



International Association of Hydrogeologists New Zealand National Chapter

IAH Christchurch: February 2019 Technical Meeting

AN INTRODUCTION TO HYDROGEOPHYSICS

Dr Eva Sutter (Cook Costello)

5:15 pm – 7:30 pm, Tuesday 12 February 2019.

Turanga Library in Christchurch; Spark Place, Ground Floor, 60 Cathedral Square

From the total 3 % of freshwater on Earth (97 % is saltwater), almost one third of the worldwide available freshwater resources are stored underground in aquifers, making up by far the largest source of liquid freshwater. And although better protected than surface water, aquifers are still vulnerable to contamination from natural and anthropogenic processes, especially the shallow, unconfined aquifer types. Increasing research attention is directed towards understanding groundwater related processes and ways of ensuring their protection in recent years. Governments also have started realizing the importance of protecting groundwater resources from anthropogenic contamination and are putting measures in place for industry to monitor their impact on this important resource.

In order to gain a deeper understanding of groundwater resources, hydrology traditionally relies on the availability of point measurements such as precipitation records, groundwater levels and chemistry or soil moisture content. This builds a necessary and solid base of information, but often is far from being complete. Hydrological models provide a way of extrapolating this point information to a larger area. However, they suffer from non-uniqueness and the fact that the variability of the subsurface geology, structure and hydraulic properties are often poorly understood. In order to overcome these shortcomings extra information is needed. Hydrogeophysical methods can provide such information.

Although around for several decades, hydrogeophysics is still rather unknown or rarely used in the hydrological community. Often geophysical measurements are completely detached from hydrological measurements and only in recent years have efforts been made to focus on combining the two fields of expertise. This talk focuses on giving an introduction to what hydrogeophysics is, which methods can be used to answer specific hydrological questions, and will showcase some field studies I have been directly involved with in the past years. It is aimed to start (or continue) a discussion between professionals from both disciplines, geophysics and hydro(geo)logy, in order to generate an understanding of where the current needs are and how these can be addressed by using geophysics as complementary tools.