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Use of thermography as tool to study groundwater-surface water interaction: A case study of a section the Diguillín river, Chile.

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An efficient management of the water resource needs to know the processes that control the availability of water in low flow periods. One of these processes is the groundwater-surface water interaction (GSW) that exists in a river. Methods as environmental tracers have been used as an indicator (spatial and temporal) of DWS interaction. Similarly, the use of temperature has been used as a tracer to study groundwater-surface water interaction (e.g. Tcherepanov et al., 2005). Because the temperature can be measured directly or remotely, it is possible to use convective water heat transport to obtain information about water movement (Constanz, 2008).
Currently, the use of temperature as a tracer to study GSW can be carried out simply and in a short time. Due to the increasing offer of unmanned aerial vehicles (UAV) with increasing load capacity (cameras, electronic system, batteries) and flight autonomy.
This paper presents a case study of the use of thermal images to determine possible groundwater income in a section of the Diguillín River (Chile). In the studied section it was possible to identify points with thermal differences that are related to the entry of colder groundwater to the section studied. This information allowed the definition of control points for stream gauging and monitoring surveys along the river. We determined the points where groundwater enter to a 2000 meters section of the river, duplicating the streamflow during low flow conditions.