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Groundwater Resources Study 20

Tritium in Shallow Groundwater of Southern Ontario

by E.H. Priebe and S.M. Hamilton

This publication can be downloaded from
http://www.geologyontario.mndm.gov.on.ca/mndmaccess/mndm_dir.asp?type=pub&id=GRS020

This Groundwater Resources Study presents a spatially detailed, tritium concentration interpolation that represents shallow, modern recharge conditions in groundwater across southern Ontario. Also included is a description of data sources, the data selection process and the approach to interpolating tritium concentrations. The tritium and well data used here were taken from the Ontario Geological Survey Ambient Groundwater Geochemistry Project (AGGP) database revision recently published by Hamilton (2021). The AGGP was conducted from 2007 to 2019 in southern Ontario with the aim of characterizing baseline groundwater geochemistry of major overburden and bedrock aquifers. The southern Ontario study area, for this project and the AGGP, covers approximately 95 000 km^2. It is anticipated that the shallow groundwater tritium interpolation offered here may be used as a proxy for the precipitation input function needed for estimating groundwater ages, to support baseflow separation, or simply to investigate relative age ranges and tritium trends in shallow groundwater systems. While no interpolation is perfectly reliable, the data and supporting information provided in this Groundwater Resources Study and its associated files offers users the opportunity to assess reliability as they interpret these result in their area(s) of interest. This release comprises 1 Microsoft® Excel® for Office 365 (*.xlsx*) workbook file, 2 raster images (as *.tif* files) for use with ESRI® ArcGIS® and 1 document in portable document format (*.pdf*). The data are available on 1 CD.

An interactive version of the tritium interpolation and standard error map (www.ontario.ca/ogsearth#tritium-in-shallow-groundwater) is available as a graphical interface or data layer (keyhole mark-up language (*.kml*) file) through OGSEarth (www.ontario.ca/ogsearth), which can be viewed using user-friendly geographic information programs, such as Google Earth™ mapping service.

Contents

The following files are included in this publication:

GRS20_tritium report.pdf provides the background information on data sources, data selection process, data set and interpolation statistics, interpolation method and error assessment.

GRS20_tritium-and-well_data.xlsx consists of 2 worksheets.

"tritium&well_data" worksheet contains the raw concentration and well data used to generate the interpolation of tritium concentrations in shallow groundwater in southern Ontario. Samples were analyzed by Isotope Tracer Technologies Inc. ("IT2"), Waterloo, Ontario, using their direct or Enriched method, or by Environmental Isotope Laboratory ("Waterloo"), University of Waterloo in Waterloo, Ontario, using their Enriched method. Drift thickness data in the table are *from* Gao et al. (2006). Locations are provided using 1) Universal Transverse Mercator (UTM) co-ordinates in metres in North American Datum (NAD83) in Zone 17; and 2) latitude and longitude in decimal degrees in World Geodetic System 1984 (WGS84).

"Abbreviations" worksheet provides a list of the abbreviations used in the workbook with explanations.

GRS20_shallow-gw-tritium.tif is a raster image, for use with ESRI® ArcGIS®, of tritium concentration interpolation in shallow groundwater.

GRS20_std-error.tif is a raster image, for use with ESRI® ArcGIS®, of prediction standard error.

References

Gao, C., Shirota, J., Kelly, R.I., Brunton, F.R. and van Haaften, S. 2006. Bedrock topography and overburden thickness mapping, southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 207.

Hamilton, S.M. 2021. Ambient groundwater geochemistry data for southern Ontario, 2007–2019; Ontario Geological Survey, Miscellaneous Release—Data 283 – Revision 2.