GeoFile 8-2023 ReadMe

Manitoba till-matrix geochemistry compilation: visible gold grains in the heavy mineral (<2 mm) size-fraction

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Abstract

This GeoFile provides a digital dataset for till-geochemistry surveys carried out in Manitoba, where the heavy mineral (<2 mm) size-fraction was analyzed for visible gold. This compilation of 24 projects includes 3804 till samples, and will be updated annually or bi-annually. This data can be brought into GIS software, and integrated with other geoscience data, to generate new exploration targets and design follow-up exploration programs.

Résumé

Ce géodossier offre un jeu de données numériques pour les relevés de géochimie du till effectués au Manitoba dans lesquels la fraction granulométrique de minéraux lourds (<2 mm) a été analysée pour évaluer la quantité d'or visible. Cette compilation de 24 projets comprend 3804 échantillons de till et sera mise à jour une fois par an ou une fois tous les deux ans. Ces données peuvent être téléchargées dans un logiciel SIG et intégrées à d'autres données géoscientifiques, afin de générer de nouvelles cibles d'exploration et de concevoir des programmes d'exploration de suivi.

DIGITAL DATA

Zip file geofile8.zip contains the following content:

- GeoFile_8-2023_ReadMe.pdf (this file)
- GeoFile_8-2023.xlsx:
  Table 1: Till-matrix visible gold data for the heavy mineral (<2 mm) size-fraction.
  Table 2: References.

Introduction

This GeoFile captures till-matrix gold grain data collected from surveys on the heavy mineral (<2 mm; –10 mesh) size-fraction of tills, carried out in Manitoba since the 1980s (Figure 1; Table 2). This GeoFile will be updated as new data is released.

Methods

Updates since 2020

New data

Continued fieldwork by the Manitoba Geological Survey (MGS) has resulted in the addition of new data gathered along parts of the Churchill and Little Churchill rivers (Hodder and Gauthier, 2023), three sections near the confluence of the Hayes and Gods rivers (Hodder and Gauthier, 2022; Gauthier and Hodder, 2023a), a part of the Fox River greenstone belt (Gauthier and Hodder, 2021; Gauthier and Hodder 2023b), and in southeastern Manitoba (Hodder, 2023a). Missed data from 1997 and 1998 samples were also added from Thorleifson et al. (2009).

The MGS obtained gold grain data from Assessment File AFN74096 (Manitoba Economic Development, Investment, Trade and Natural Resources, Winnipeg), which was published as Hodder (2023b) and till samples added herein.

Snow Lake dispersal train

Data given to the MGS in late 2022 was added from 122 sites over bedrock with mineralized gold potential. These till samples, taken at 0.5–1 m depth from the C horizon, outline a dispersal train roughly 2 km long that trends to 190° from Snow Lake Narrows to Photo Lake. Total visible gold grains in this dispersal train, averaging 41.9 g dry nonferromagnetic weight (24.8–50.8 g range), are the highest in the current dataset (35 to 1479 plus one site with 10 000).

Other highly anomalous sites in the database include 91SL012 (307 gold grains near the Narrows on Herblet Lake, possibly associated with the Moss 1 abandoned mine site), 90SL111 (286 gold grains 2.3 km south of Photo Lake), 91SL141 (149 gold grains near Wedge Point on Wekusko Lake), 92MOB1132 (138 grains on the southwestern side of Reed Lake), and 92EL024 (123 visible gold grains at the southwestern end of Webb Lake. It should be noted that the four historical samples identified here are all within Precambrian-shield–rich till that does not contain calcareous detritus. Calcareous detritus often dilutes mineralization signals, meaning that lower grain counts may still signal anomalous mineralized detritus within calcareous tills.

Changes

Depth of sample was separated into two columns titled “Depth_top_m” and “Depth_bottom_m” to enable better correlation with others datasets.

Corrections

The coordinates from GSC_OF2750 (Thorleifson and Matile, 1993) and MGS_OF2009-13 (Thorleifson et al., 2009) have been corrected to NAD83, as the first release still had them in NAD27. Further to that, samples from Thorleifson and Matile (1993) were corrected for depth and sampled material using Matile et al. (2023). It is now possible to re-examine those results using the stratigraphy to delineate different till units deposited over time.

Collection methods

Till samples were collected from road cuts, borrow pits, ditches, natural exposures, hand-dug holes, Dutch-auger holes and boreholes across Manitoba. Wherever possible, till samples were collected from the C horizon in order to minimize potential weathering effects. To learn more about the characteristics of individual till samples, the reader is encouraged to view the original publications.

Data captured include all data immediately relevant to the till sample (Table 1). This includes publication number, laboratory used, project name, spatial coordinates, depth of sample and other important information. MGS project numbers are only assigned to some projects, as this is a 2019 internal initiative designed to better track projects from year to year. The user should note that the compilation includes samples taken at depth, in some cases by drilling and in others accessed by natural river sections.

Sample location

Sample locations are provided for each till sample. Technically, Manitoba crosses three UTM zones (14 to 16). For ease of display in GIS, all data have been re-projected into zone 14. Hence, all coordinates herein are reported as UTM zone 14, NAD83. Some older samples may be misplaced by as much as 200 m, as it is unknown when recording methods switched from NAD27 to NAD83. While coordinates were compiled from the original reports, some projects were pre-GPS and the locations were digitized from hand-drawn field maps. Again, the coordinates of these older till samples are to be used as a guide rather than a precise location. This is why the data table includes the column ‘Year_sampled’ instead of the publication year (Table 1).

Analytical methods

Till samples were processed for visible gold at Overburden Drilling Management Limited (ODM; Ottawa, Ontario). Samples were disaggregated and sieved to obtain the <2 mm size-fraction, and then processed using a double-run across a shaking table. The table preconcentrate was then panned to recover any gold minerals.

All data are included herein, and no efforts have been made to compare methods. Problematically, the table-feed weight and/or the nonferromagnetic weight has been lost for some samples, which makes comparison between samples difficult. The calculated ppb visible gold (Table 1, column AD) is a proprietary

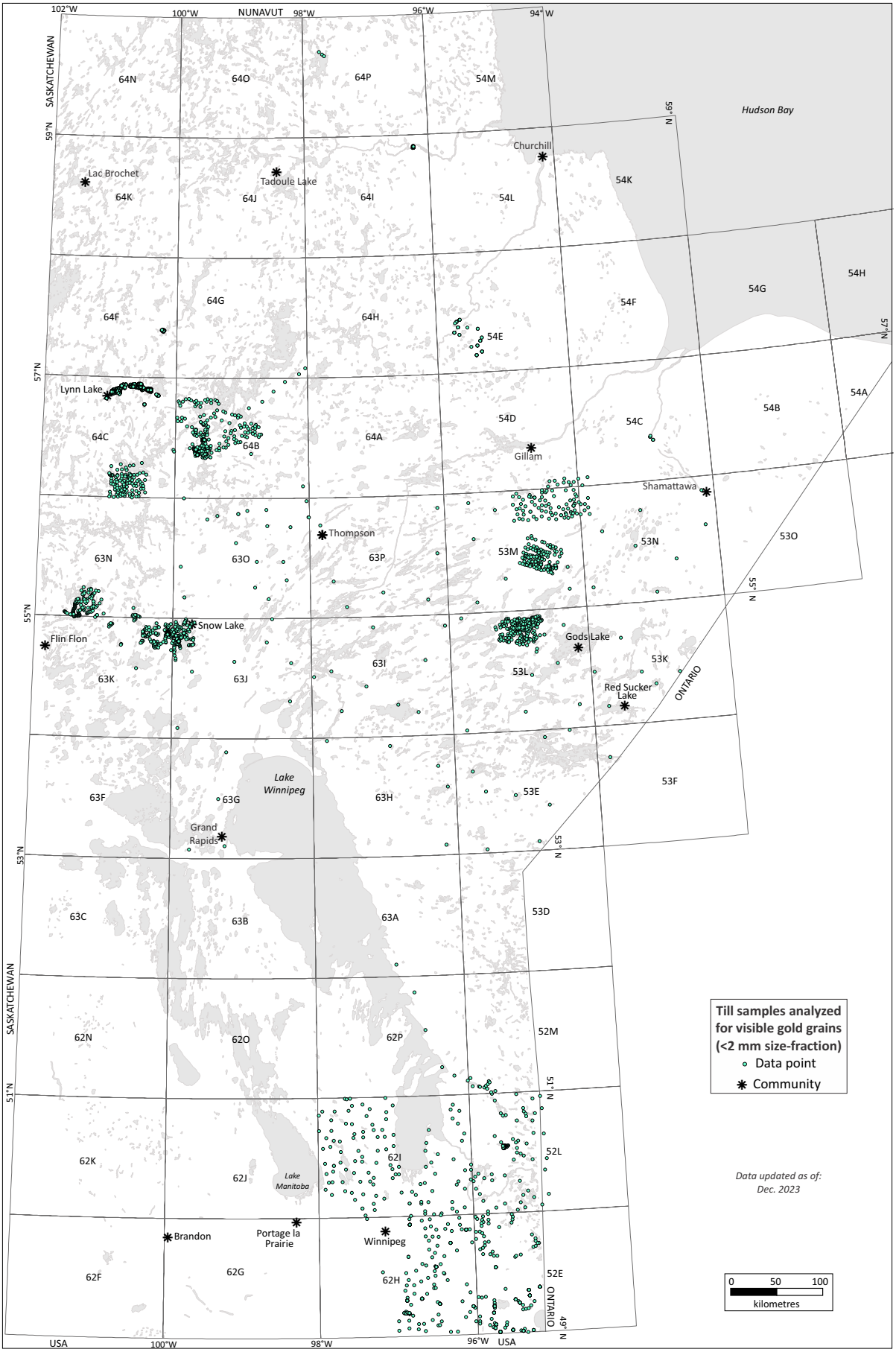

Figure 1: *Till-sample locations where the heavy mineral (<2 mm) size-fraction of the matrix was analyzed for visible gold grains in Manitoba.*

calculation conducted by ODM using the dimensions of the gold grains.

Supporting data

The original files for each project can be found through the Bibliography of Manitoba Geology and Resource Centre catalogue (Manitoba Geological Survey, 2020). To help with analysis, the following data is also available:

- Manitoba till-matrix geochemistry compilation: total carbonate of the silt plus clay (<63 µm) size-fraction (Gauther, 2023)
- index of Manitoba surficial geology maps (Manitoba Geological Survey, 2022)
- compiled digital surficial materials maps (Manitoba Geological Survey, 2017)
- digital compilation of surficial point and line features, including ice-flow data (striations, streamlined landforms) and bedrock-outcrop locations (Gauthier et al., 2022a)
- the current understanding of ice-flow history in Manitoba (Gauthier et al., 2019; Gauthier et al., 2022b)

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