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GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA

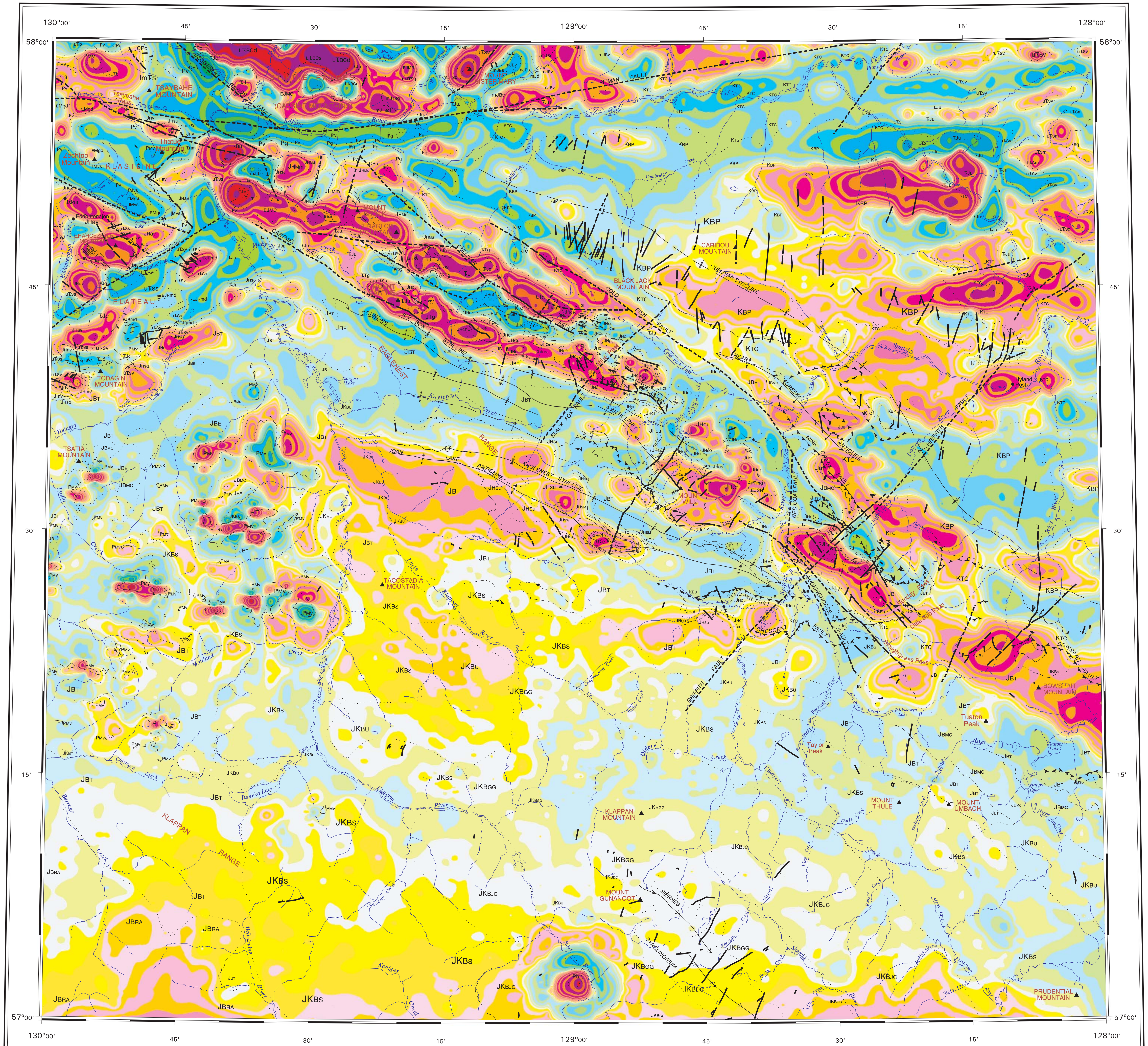

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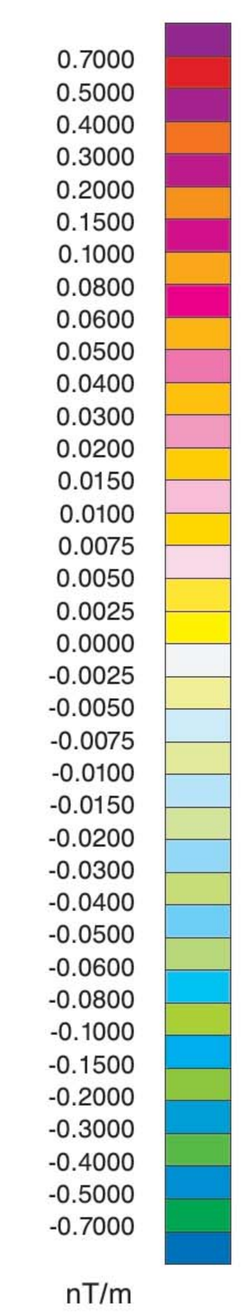
Figure 166a. Aeromagnetic map of Spatsizi River map area with major structures and boundaries of geological units.

Scale 1:250 000/Échelle 1/250 000

kilometres 5 0 5 10 15 20 kilomètres



DESCRIPTIVE NOTES

The magnetic data represent the first vertical derivative of the residual total magnetic field intensity. The data are from the holdings of the National Aeromagnetic Data Base maintained by the Geological Survey of Canada. The data were collected in order to map the intensity of the Earth's magnetic field over the Canadian landmass and adjacent offshore areas. Variations in intensity are due to changes in a physical property (magnetic susceptibility) of the underlying rocks. These data are useful for geological mapping and interpretation, and find application in mineral, oil, and gas exploration.

The magnetic data are from surveys flown at a constant barometric altitude of 2700 m mean terrain clearance with a line spacing of 1609 m. The data were digitized from contour maps at the intersection of the flight lines and contours. The data were draped to an idealized 305 m mean terrain clearance surface. All data have had the International Geomagnetic Reference Field (IGRF) removed and have been levelled to the national datum. The data have been gridded to 400 m for this presentation. The image presented here is the first vertical derivative of the residual total magnetic field intensity. It quantifies the rate of change in the magnetic field in the vertical direction and is equivalent to measuring the field with two vertically separated magnetometers and dividing the difference in field strength by the separation distance. The 400 m grid of the magnetic data was converted to the frequency domain using a fast Fourier transform. The vertical derivative transform function was applied to the frequency-domain data, enhancing higher frequencies. The data were then returned to the spatial domain using an inverse fast Fourier transform. The filter removes the long-wavelength component and helps resolve closely spaced, even superposed anomalies. The derivative operation also enhances noise in the data which limits the utility of higher order derivatives. The vertical derivative is often used to trace contacts between large-scale magnetic domains, as it has a value of zero over vertical contacts (Hood, 1965). Digital gridded or profile data of these data are available from the Geophysical Data Centre, Geological Survey of Canada, Room 235, 615 Booth Street, Ottawa, Ontario K1A 0E9. Tel: (613) 995-5326, FAX: (613) 952-8987, E-mail: infogdc@agg.NRCan.gc.ca WWW: http://gdcinfo.agg.NRCan.gc.ca/.

GEOLOGICAL INTERPRETATION

The pattern of anomalies corresponds well to the distribution of the major map units. Areas underlain by the Bowser Lake and Sustut groups coincide with broad low negative to low positive magnetic anomalies, in contrast to those of Stikinia strata and Cenozoic volcanic units (Maitland Volcanics and the Pleistocene Nass Valley cone). Within Stikinia, areas of Paleozoic strata exhibit consistent, moderately negative magnetic anomalies, whereas areas underlain by Triassic strata are highly variable, showing strong positive to moderately negative anomalies, and Early to Middle Jurassic strata (Hazelton Group) exhibit generally, but not exclusively, positive magnetic anomalies. The strongest positive anomalies coincide with areas of outcrop of Late Triassic and Early Jurassic intrusive rocks. The Maitland Volcanics commonly correspond to high-amplitude, low-wavelength positive anomalies, although a few of the flow remnants correspond to areas of negative anomalies. The Pleistocene cone in the Nass River valley coincides with a strong positive anomaly.

The area of Sustut Basin between Griffith and Black Fox faults has a number of moderate to strongly positive magnetic anomalies. These are interpreted as supporting the suggestion that the faults are present beneath the cover of the Brothers Peak Formation. Some of the anomalies coincide with deep river valleys, and appear to reflect the relatively thin sedimentary cover of the Sustut Basin where the topography has cut deeply into basin strata. A northwest-trending, elongate, positive anomaly is coincident with the Joan Lake Anticline, and suggests that the core of Hazelton Group volcanic rocks continues west beneath the Bowser Lake Group, from the Joan Lake area to the Klappan River. Similarly, the positive anomalies south of the Bowsprit Fault suggest that clastic rocks overlying Triassic or Early to Middle Jurassic volcanic and/or intrusive rock is relatively thin. Refer to GSC Map 2040A for names, ages, and descriptions of the map units. Only the major structures are shown, and contacts are extrapolated through areas of Quaternary cover.

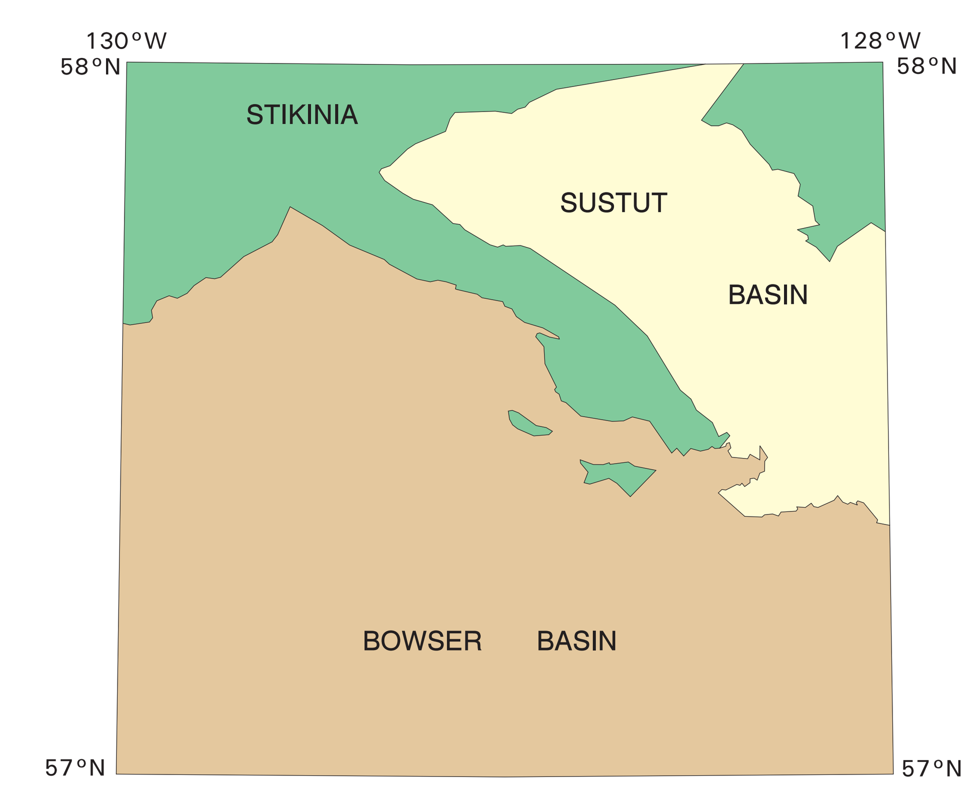


Figure 166b. Tectonic elements of Spatsizi River map area (NTS 104 H)

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