GEOLOGICAL SURVEY OF CANADA Natural Resources Ressources naturelles Canada 141°00' 139°00' LEGEND STEWART RIVER MAP AREA (115 N & O) OPEN FILE 1772 MICA-QUARTZ SCHIST/PARAGNEISS: undivided metasedimentary rocks dominated by metapsammite, semipelite and metapelite; commonly AUGEN GNEISS: K-feldspar augen granite; exhibits various states of strain including garnet-biotite-muscovite +/-plagioclase schist; generally heterogeneously layered; Fluvial silt, sand and gravel deposits porphyroclastic straight gneiss grades locally to paragneiss; varies to quartz-mica schist STEWART RIVER AREA METACONGLOMERATE: pebble- to boulder-sized rounded clasts; mainly massive FELSIC GNEISS: pink to orange felsic orthogneiss; banded to layered; veined and/or (PARTS OF 115 N/1,2,7,8 AND 115-O/2-7,12) white vein quartz, but including some granitoid clasts (tonalite?); has an arkosic segregated; derived from felsic granitoid sheets matrix; grades into quartzite; matrix supported PORPHYRY: quartz-K-feldspar porphyritic rhyolite to rhyodacite stocks and dykes QUARTZITE: banded to massive, grey to white quartzite; apparantly clastic in origin, or in part, possibly derived from metachert; possibly correlates with Nasina Quartzite 6/9 UNDIVIDED AMPHIBOLITE AND GREY GNEISS UNITS YUKON TERRITORY CARMACKS GROUP: rhyodacite, dacite, rhyolite, with lesser andesite and basalt GREY GNEISS: intermediate to mafic orthogneiss; generally grey; banded to layered; Scale 1:100 000/Échelle 1/100 000 Metavolcanic, Volcaniclastic, and Altered Orthogneissic Rocks 9 commonly veined; derived from intermediate granitoid (tonalite to diorite) sheets; usually interlayered with amphibolite schist and gneiss NATIONAL TOPOGRAPHIC SYSTEM REFERENCE LOWER CRETACEOUS MUSCOVITE-CHLORITE SCHIST: muscovite-chlorite-quartz-feldspar schist, chlorite schist, chlorite phyllonite; local cleaved lapilli tuff with preserved primary texture CONGLOMERATE: clast-supported pebble to cobble conglomerate with clasts of vein quartz and foliated quartzite; may correlate with Tantalus Formation Metavolcanic(?) and Volcaniclastic(?) Rocks Transverse Mercator Projection Cumulative progress of bedrock mapping in the Stewart River area (reference to GSC open files in brackets). The grid Central meridian 139°37'30"W, Scale Factor 0.9996 Méridien central 139°37'30"W, facteur d'échelle 0.9996 NOTE: Relative ages of many units are unknown; superimposed hillshade may darken colours on map from those shown on legend above MAFIC SCHIST: biotite-hornblende+/-plagioclase+/-quartz metabasite?; generally North American Datum 1983 Système de référence géodésique nord-américain, 1983 outlines 1:50 000 NTS boundaries. Helicopter-borne detailed associated with amphibolite; main locality on Thistle Mountain © Her Majesty the Queen in Right of Canada, 2003 © Sa Majesté la Reine du chef du Canada, 2003 aeromagnetic and gamma-ray surveys were flown in 2000 and 2001. Mapping planned for 2003 would complete areas GRANITE: pink to grey, locally porphyritic, syenogranite to monzogranite plutons and to the extent of the red dotted line. FELSIC SCHIST: quartz-sericite schist or metafelsite, possibly derived from felsic SYMBOLS volcanic or hypabyssal intrusive rocks, e.g. rhyolite or quartz-feldspar porphyry Geology by J.J. Ryan and S.P. Gordey (2000, 2001, 2002), Mean magnetic declination 2003, 25°29'E, P. Glombick and S. Piercey (2002) decreasing 17.9' annually AMPHIBOLITE: amphibolite schist and gneiss; metabasite; probably derived from (defined, approximate, assumed) . . GRANODIORITE: chlorite-altered hornblende- and biotite-bearing granodiorite, Hillshade model by K. Shimamura 6 matic to intermediate volcanic or volcaniclastic rocks; locally associated with monzogranite, quartz monzonite and quartz monzodiorite Fault, sense of movement uncertain psammite or interlayered with orthogneiss Elevations in feet above mean sea level (defined, approximate, assumed) . ._____ Any revisions or additional geological information known to the user (metres where noted) PALEOZOIC AND/OR MESOZOIC would be welcomed by the Geological Survey of Canada Limit of mapping . FOLIATED GRANITE: deformed (foliated to gneissic), felsic to intermediate Contour interval 200 feet MARBLE: marble (metacarbonate) derived from pure to impure limestone; associated monzogranite, granodiorite, quartz monzonite Digital base map at a scale of 1:50 000 from data compiled by (40 metres where noted) calc-silicate schist derived from calcareous metapelite Geomatics Canada, modified for 1:100 000 by ESS Info Ancienne marge du Pacifique Foliation (S2,S3) . QUARTZ-MICA SCHIST AND MICA-QUARTZ SCHIST/PARAGNEISS UNITS Mineral (elongation) lineation (L2) . GABBRO: metagabbro (locally garnet-bearing); diabase, metabasite Minor fold axis (F1, u-fold) . MID(?)- TO LATE PALEOZOIC Minor fold axis (F2, u-fold, z-fold, s-fold) QUARTZ-MICA SCHIST: quartz-muscovite-biotite schist possibly derived from Ultramafic and Gabbroic Rocks 4 siliceous siltstone; commonly finely interlayered with garnet metapelite; commonly Minor fold axis (F3, u-fold, s-fold) . ULTRAMAFIC-GABBRO: amphibolite facies metagabbro, metapyroxenite, serpentinite and talc-siderite schist; 12a, dominantly serpentinite contains beds of micaceous quartz arenite Minor fold axial plane (F2, F3) . Station (observation point without structural data) . Access into the heart of the Stewart River area is afforded by boat along the Yukon and Stewart rivers. Helicopter landings are restricted by extensive tree cover except in local areas of high elevation. Mapping was undertaken mainly by foot traversing from the Yukon and Stewart rivers, from roads in the Henderson Dome area and from short camps mobilized by helicopter. All-terrain vehicles were used on placer mining access roads along Thistle, Kirkman, by foot traversing from the Yukon and Stewart rivers, from roads in the Henderson Dome area and from short camps mobilized by helicopter. All-terrain vehicles were used on placer mining access roads along Thistle, Kirkman, Henderson and Maisy Mae creeks and the Sixty Mile River. Helicopter spot checks were used to fill in widely separated outcrops in the southwest part of the map area where foot traverses or fly camps were impractical. An extensive area of low to medium grade muscovite-chlorite schist (unit A) in the western part of the map area, correlated by Tempelman-Kluit (1974) with the Klondike Schist (McConnell, 1905) is derived from a combination of volcanic, volcaniclastic and plutonic rocks. Southeast of the White River this succession may lie beneath a low-angle fault. To the northwest, contact relationships are unclear. These rocks are possibly of Permian age. Geological mapping in the Stewart River area (NTS 115 N, O) is a component of the Ancient Pacific Margin NATMAP Project, initiated by the Geological Survey of Canada, Yukon Geological Survey, and British Columbia Geological Survey Branch. The NATMAP Project seeks to understand the composition, relationships, and metallogeny of poorly understood pericratonic terranes lying between the ancestral North American margin and those known with more certainty to be tectonically accreted (Thompson et al., 2000; Colpron et al., 2001). The Stewart River component focuses on the Yukon-Tanana terrane, comprising complexly deformed, mostly (?)Paleozoic meta-igneous and metasedimentary rocks. Similar to areas mapped in 2000 and 2001, bedrock mapping during 2002 was hampered by a thick (~1 m) soil veneer, thick gravel, and loess deposits in valley bottoms, and by thick cover of forest, moss, and lichen. The detailed aeromagnetic and gamma-ray surveys (Shives et al., 2002) have proved effective as an aid to bedrock mapping in this poorly exposed, unglaciated terrain. The Paleozoic rocks in the field area exhibit a regional foliation (ST), characterized by high-strain transposition of layering in the gneisses and schists, with abundant intrafolial isoclinal folds that are commonly rootless. The intensity of strain within the regional foliation locally grades to mylonite. Primary compositional layering (S0) in metasedimentary rocks, unit contacts, and a pre-existing foliation (S1) can be traced around closures of the transposition folds, indicating that they are at least F2 structures. F2 deformation appears to accompany the regional metamorphism, and preliminary geochronological results indicate that this happened during the mid-Permian (Villeneuve, in prep). The F2 folds are generally recumbent to shallowly inclined, close to isoclinal, long-wavelength structures. They commonly lack an axial planar foliation, and their axes parallel a regional extension lineation (L2). This relationship helps distinguish F2 and F3 folds, which can have very similar style. The latter are open, moderately inclined (but varying from shallow to steep), shallowly plunging structures, that have weak axial-planar fabric where developed in schistose layers, and have no associated extension lineation. The map area is also affected by faults of varying significance. Most of these could not be observed directly, but are interpreted from changes in rock type and/or structural grain; some are also well delineated by prominent physiographic and aeromagnetic lineaments. Locally, fault breccia and slickensides provide direct evidence of fault contacts. GEOLOGICAL FRAMEWORK The objective of the Stewart River project is to investigate the stratigraphic, structural, and tectonic history and the economic framework of this large tract of Yukon Tanana terrane by mapping about 2/3 of the area over a four year period. Geology is being interpreted in light of new geophysical data collected in this area under the Targeted Geoscience Initiative (Shives et al., 2002). Concurrent surficial geological studies are aimed at understanding the Quaternary history and setting of the numerous placer gold deposits in the region (e.g. Jackson et al., 2001, 2002; Rotheisler et al., 2003). The Stewart River area is underlain by twice-transposed, amphibolite-facies gneisses and schists of mostly(?) Paleozoic age. These are intruded by younger plutonic rocks (Jurassic, Cretaceous and Eocene; units 15, 16,19) and overlain by Upper Cretaceous volcanics (unit 18) and local occurrences of Lower Cretaceous conglomerate (unit 17). Metasiliciclastic rocks are widespread, and dominated by psammite and quartzite, with lesser pelites and rare conglomerate. The reader is directed to Ryan and Gordey (2001a, b; 2002a, b) and Ryan et al. (2003) for a more comprehensive description of the geology. Mapping in 2003 focused on sheets NTS 115 N/1, 2, 7, 8 and portions of sheets NTS 115-O/2, 5, 6, 7, 9, 10, 12. Ease of access and logistical opportunity has controlled areas mapped to date and have led to an irregular distribution of ground covered. In summer 2003, holes in the mapping will be filled and the mapping extended to cover about twelve 1:50 000 scale map areas (see index figure in title block). These new data and previous work in surrounding areas (e.g. Bostock, 1942; Tempelman-Kluit, 1974) will be synthesized into a new geological map of the Stewart River area to be released in 2004-05. The siliciclastic rocks (units 1-5) have been previously thought to be as old as late Proterozoic (e.g. Tempelman-Residual and Protection (e.g. tempermannia to be as old as late Protection (e.g. tempermannia that, 1974); however, preliminary detrital zircon geochronology and geochronology for plutonic rocks constrain them to middle Paleozoic age (Villeneuve, in prep.). Intermediate to mafic composition amphibolites (including units 6-8) interdigitate with, and lie stratigraphically above, the siliciclastic rocks. Although intensely tectonized, heterogeneous compositional layering and local vestiges of primary textures in the amphibolites such as breccia clasts and pillow selvages indicate derivation from volcanic and volcaniclastic rocks. Marble horizons (unit 5; reefs?) occur within the Finlayson Lake: a progress Report; *in* Yukon Exploration and Geology, 1997; Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p. 51–58. 1942: Ogilvie, Yukon Territory; Geological Survey of Canada, Map 711A, scale 1:250 000. 2001: Petrology and tectonic setting of mafic and felsic volcanic and intrusive rocks of the Finlayson Lake volcanic-hosted massive sulphide (VHMS) district: a record of mid-Paleozoic arc and Colpron, M. and Yukon-Tanana Working Group back-arc magmatism and metallogeny; Ph.D. thesis, University of British Columbia, 2001: Ancient Pacific Margin an update on stratigraphic comparison of potential volcanogenic massive sulphide-hosting successions of Yukon-Tanana Terrane, northern British Columbia and Yukon; *in* Yukon Exploration and Geology 2000; Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p. 97–110. 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