some distinct patterns. Across the orogen, hornblende plateau ages are typically 1770 to 1750 Ma. Biotite and muscovite from the western THO (Rottenstone, La Ronge, Glennie, and Hanson domains) are typically 1740-1700 Ma, which contrasts with 1760 Ma mica ages from the eastern THO (Kisseynew, Snow Lake, Flin Flon domains). The lowest metamorphic grade rocks from the southern Flin Flon Domain give older (>1800 Ma) mica and amphibole cooling ages. Mineral ages are quite scattered (1680 to 1760 Ma) throughout much of the Thompson Belt located in far eastern THO.

A relatively short time elapsed between peak metamorphic conditions to cooling below ~300°C. The consistency of hornblende cooling ages suggests that most of the THO passed through ~500°C by 1750 Ma. The difference in mica ages from east to west indicate that the western THO cooled at an average rate of ~5°C/Ma from 500 to 300°C, whereas the rate in the east was at least 10 to 20°C/Ma. Because domain boundaries do not define age boundaries, the THO probably cooled as a united block with minor differential erosion and/or tilting from west to east.

Argon K-feldspar results indicate long-term (>400 Ma) crustal residence between 200-250°C following initial cooling by ca. 1700 Ma and thermochronologically establishes the onset of cratonization of the THO. Apatite fission-track apparent ages are 400-460 Ma and do not show marked differences across structural boundaries (e.g. Tabbanor fault). Mean track lengths of 11.4-12.2 μm indicate significant cooling since the Cretaceous.

4:15 PM Mosher, S.

EVIDENCE FOR AN ACTIVE SOUTHERN LAURENTIAN MARGIN FROM 1288-1232 MA - LLANO UPLIFT, CENTRAL TEXAS

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The southern margin of Laurentia, as preserved in the Llano Uplift of central Texas, was apparently an active margin with continental arc magmatism and sedimentation from ~1288-1232 Ma.

Recent U/Pb geochronology has confirmed that polydeformed metamorphic rocks in the Llano Uplift record a major period of magmatism from 1288 to 1232 Ma with most protolith ages clustering between 1275 to 1247 Ma. Intrusive rocks in small plutonic bodies, sills and highly attenuated sheets throughout the uplift are primarily granitic in composition, although minor mafic components include diorites, gabbros, and basaltic sills. The geochemistry of these rocks supports an arc-related origin.

Volcanic rocks yield protolith ages of 1257-1247 Ma and are rhyolitic to dacitic in composition, although minor pillow basalts have been identified. Volcanic rocks are interlayered with volcanoclastic, clastic and carbonate sedimentary rocks. Although polydeformed and imbricated by ductile shear zones, the overall sedimentary sequence is compatible with a transition from a continental margin to deeper water southward. Sedimentary rocks in the north are compatible with an arc source and fluvial, near shore, tidal flat, and probable restricted lagoon environments. Evidence for extensive weathering prior to metamorphism is indicative of subaerial exposure, consistent with a terrigenous/shallow water environment.

Existing data shows a distinct hiatus between addition of this new crust at ~1288-1232 Ma and intrusion of the ~1119-1070 Ma late syn- to post-tectonic granites at the close of Grenville orogenesis. Except for a discrete exotic arc (1326-1275 Ma; Coal Creek Domain) in the southeastern uplift, only one occurrence of older granitic crust (1366 +/-3 Ma) within the plutonic rocks has been identified.

4:30 PM McLelland, James

NEW SHRIMP AGES FOR LATE ADIRONDACK HIGHLAND LEUCOGRANITES: INHERITANCE PROBLEMS AND TIMING OF THE TERMINAL OTTAWAN OROGEN

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Three late- to post-tectonic leucogranites dated by SHRIMP methods constrain timing of the waning phases of the ca 1.1-1.0 Ga Ottawan Orogeny. Two of the three cases are compatible with five prior determinations of emplacement age of late- to post-tectonic Lyon Mt Gneiss (LMG) at ca.1050 Ma, marking termination of significant Ottawan orogenesis in the Adirondack Highlands. 1) AM 86-4. Pink quartz-perthite leucogranite with minimal grain-shape fabric along Route 3, west of Tupper Lake. The sample contains equant and elongate zircons with deeply embayed cores (1155 +-15 Ma) surrounded by thick, faintly zoned mantles (1060 +-12 Ma.). The mantling zircon dates the emplacement of these late- to post tectonic leucogranites consistent with other LMG. A previous bulk zircon age of 1075 +-17 Ma reflects core inheritance.2) PL-3. Pink quartz-perthite leucogranite containing abundant quartz-sillimanite veins and nodules and exposed in the Moose River near Port Leyden. The rock exhibits little grain shape fabric and local crosscutting dike phases exist. Elongate zircons exhibit large, well zoned cores (1150-1170 Ma) that are partially mantled by ca 1035 Ma rims. Earlier single grain TIMS work yielded a discordant array of ca 1035 Ma grains and tips, and a single euhedral,, doubly terminated, zoned grain was concordant at 1034 +-2 Ma. A concordia plot of all these analyses yields a tightly constrained upper intercept of 1037 +-5 Ma which is taken as the emplacement age of the granite and a lowermost age for significant Ottawan orogenesis. 3) CAT-98. A swarm of pink leucogranitic dikes with LMG bulk chemistry truncate ribbon gneiss on Cathead Mt, southern Adirondacks. Very elongate, well zoned, high U zircons are highly discordant but two grains are nearly concordant at ca 950 Ma. This surprising result is consistent with similar granitic ages in the Pinware terrane of Labrador and corresponds to Rb-Sr and Ar-Ar ages for late Adirondack pegmatites. Intact grains of ca 1035,1150 and 1300 Ma age show minimal resorbtion or rimming and attest to the efficacy with which leucogranites entrain and preserve source rock and wall rock zircons as xenocrysts.

4:45 PM Solari, Luigi A.

TECTONIC HISTORY OF THE OAXACAN COMPLEX, SOUTHERN MEXICO: STRUCTURAL AND GEOCHRONOLOGICAL CONSTRAINTS

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The Oaxacan Complex (OC) is the largest and southernmost exposure of high-grade, Grenvillian rocks in Mexico. It's composed of both sedimentary and igneous protoliths, metamorphosed to granulite facies and with a complex history of retrogression, probably during exhumation and consequent decompression.

The studied area in the northern OC is composed of an igneous sequence, characterized by charnockites, syenites, mangerites and granites, whose magmatic ages span between ~1,150 Ma and 1,045, that are in tectonic contact with older migmatitic granitoids as old as ~1,300 Ma, and undated metapelitic gneisses. Based upon geochemical data, some of these igneous rocks have been interpreted as arc-related. The discrete shear zones recognized in the field are probably related either to the last pulse of Grenvillian age deformation, or to the post-Grenvillian exhumation that affected the OC, juxtaposing different tectonic units. Mafic magmatism, composed of titaniferous gabbros and anorthosites, predates granulite metamorphism and post-dates migmatization, which occurred at ~1,106 Ma (U/Pb on concordant zircon). Mafic magmatism occurred prior to the final continental collision, probably during an extensional episode within an intra to back-arc setting.

Structural history reconstructed so far, starts with a pre-migmatization, small scale isoclinal folding, recognized inside strain windows in the migmatites and possibly inside gabbros. Those folds were refolded during migmatization, and at least once more by recumbent folding during granulite facies metamorphism that occurred at about 990-1,000 Ma (directly dated by U/Pb on nearly concordant zircons in anorthosites, and indirectly by post tectonic pegmatites that yielded concordant ages of 969, 976 and 980 Ma). Greenschist facies upright folding posdated both granulite facies peak and ductile shearing and reoriented previous structures into a NNW-SSE trend, probably during the Late Proterozoic. Reconnaissance U/Pb geochronology on orthogneisses in the southern OC confirms data in the northern OC: magmatic ages range around ~1,130±50 Ma, whereas granulite facies metamorphism occurred between 984 and 994 Ma.

These data confirm that the Oaxacan Complex acted as a homogeneous terrane in the Grenville Ocean, although its role during the Laurencia-Gondwana collision is still under debate.

5:00 PM Cordani, Umberto G.

U-PB SHRIMP AGES FOR LATE PROTEROZOIC ACID VOLCANICS OF SOUTHERN BRAZIL: TECTONIC IMPLICATIONS

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The Itajaí, Corupá, Campo Alegre, Guaratubinha, Camarinha and Castro volcanic-sedimentary basins are the most important record; in southeastern Brazil, of geological events wich occurred at the end of the Neoproterozoic and beginning of the Cambrian. They can be classified into two groups, according to their relationships with Neoproterozoic fold belts. The Itajaí and Camarinha foreland basins exhibit epiclastic sediments deposited in a range of environments from delta fans to distal turbidites. The extensional late collisional basins of Campo Alegre, Guaratubinha, Corupá and Castro exhibit an important intermediate to acid volcanic component, represented by lavas, pyroclastics and subordinate dykes.

Previously available radiometric dates, by the K-Ar and Rb-Sr methods, were unconclusive, yielding apparent age values between 550 and 430 Ma., some of them too young to account for the existing stratigraphic control. SHRIMP U-Pb determinations in zircons from acid volcanics in the Campo Alegre (595 +/- 16 Ma) and Itajaí (563 +/- 14 Ma) basins demonstrate that sedimentation within these basins is restricted to the Neoproterozoic. Volcanism in the Castro basin is slightly younger (543 +/- 12 Ma). The Itajaí and Camarinha basins were affected by the terminal stages of the tectonic evolution of the adjacent fold belts, whose deformation is placed at about 530 Ma, by Rb-Sr whole-rock isochron data.

The geological association and age similarity between these late-collision volcanic-sedimentary basins and the several alkaline-peralkaline granitoid complexes permits the assumption that they may represent different aspects of a relevant distensional Neoproterozoic episode which affected southern Brazil. This tectonic episode was succeeded, in early Paleozoic times, by a compressional regime related to the collision of the Serra do Mar microplate, in the general context of the agglutination of West Gondwana. All the mentioned volcanic-sedimentary basins contributed to the crustal weaknesses which preceeded the emplacement of the very large Paraná intracratonic basin, for which the oldest sedimentary sequences were deposited in Ordovician times.

5:15 PM Hessler, Angela M.

ARCHEAN WEATHERING RINDS ON PEBBLES FROM THE MOODIES GROUP, BARBERTON GREENSTONE BELT, SOUTH AFRICA

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Preserved weathering rinds on pebbles from the 3.2 Ga Moodies Group provide evidence of the chemical interaction between the atmosphere, surface waters, and outcrop in the middle Archean. The pebbles under study are from alluvial conglomerates at the base of the Moodies Group. They were collected from core to avoid the effects of more recent weathering. Rinds, 2 to 10 mm thick, are occasionally visible in hand sample, but most are seen only microscopically. In hand sample, most rinds appear bleached compared to the pebble core, a small percentage are blackened compare to the core, and one sample has a reddish rind. This is in contrast to modern pebbles collected from streams in the Sierra Nevada and Klamath Mountains, which predominately have reddish or brownish rinds and are seldom bleached.

Electron microprobe analyses were performed to quantify mineralogical and chemical differences between these Archean and modern pebble weathering rinds. Several methods have been tested. Linear scans give micron-stepped major element analyses across the rind and into the pebble core; parallel scans give the equivalent of bulk rock major element analyses, separately for the rind and pebble core. Mineralogy maps are made to compare relative mineral abundances between the rind and core. As well, individual minerals are analyzed for major elements, to see how elements within minerals have been mobilized during weathering.

Although not all Archean pebbles analyzed in this study show an Fe-depletion, and in fact a small number have Fe-enriched rinds, a significant number of Archean rinds show Fe-depletion when compared to the mostly Fe-enriched rinds of modern pebbles. Although this could be a local phenomenon, it does suggest that anoxic to reducing conditions of weathering of these rinds allowed ferrous iron to leave the system in solution. Also, siderite is a common component of the Archean weathering rinds, while it has not been observed in the modern pebbles. Siderite is a reduced-iron carbonate that requires relatively high amounts of dissolved carbon dioxide and reducing conditions; this has implications for both the carbon dioxide and oxygen contents of the surface fluid and atmosphere within which these Archean pebbles were weathered.