STRATIGRAPHIC COLUMNS FOR NORTHEAST ASIA GEODYNAMICS MAP

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Introduction and Companion Studies

The 184 stratigraphic columns for major tectonostratigraphic terranes for the Northeast Asia geodynamics map are provided in this directory. The columns depict the major general characteristics and ages of sedimentary, volcanic, and plutonic units, and other major metamorphic and tectonic events, for the major terranes and for the major overlap assemblages that are deposited on terranes. The columns were prepared and are presented using the methodology developed for the previous, similar project on the Russian Far East, Alaska, and the Canadian Cordillera (Nokleberg and others, 1994b). The columns are companion materials for both the geodynamics map and for the descriptions of tectonostratigraphic terranes, and overlap assemblages. The columns, maps, and descriptions are compiled, described, and interpreted with the use of modern concepts of plate tectonics, and analysis of terranes and overlap assemblages. The map is the result of a detailed compilation and synthesis at a scale of 1:5,000,000.

The stratigraphic columns are in Corel Draw 10 and Adobe Acrobat Reader (PDF) formats. The files for the columns are arranged in alphabetical order of terrane abbreviation. This order matches that of the descriptions of terranes in another part of this report. Also provided in the file entitled Column Explanation is the explanation of the symbols employed in the columns. Because of the uncertainty of the ages of protoliths, stratigraphic columns for

cratonal terranes are not provided. And because of the diverse nature and ages of protoliths for fragments, stratigraphic columns for melange terranes are not provided.

This text and companion materials are part of a major international collaborative study of the *Mineral Resources, Metallogenesis, and Tectonics of Northeast Asia* that is being conducted from 1997 through 2002 by geologists from earth science agencies and universities in Russia, Mongolia, Northeastern China, South Korea, Japan, and the USA. The goals and major and minor publications for this project are described in a pamphlet entitled NE_Asia_Project_Pamphlet in the director entitled PROJMAT.

This report is one of a series of reports on the mineral resources, metallogenesis, geodynamics, and metallogenesis of Northeast Asia. Companion studies are other articles and maps on this CD-ROM, and various detailed reports in preparation: (1) a detailed geodynamics map of Northeast Asia (Parfenov and others, 2003); (2) a compilation of major mineral deposit models (Rodionov and Nokleberg, 2000; Obolenskiy and others, 2003a); (3) a series of metallogenic belt maps (Obolenskiy and others, 2001; 2003b); (4) a lode mineral deposits and placer districts location map for Northeast Asia (Obolenskiy and others, 2003b); (5) descriptions of metallogenic belts (Rodionov and others, 2000, this report; and (6) a database on significant metalliferous and selected nonmetalliferous lode deposits, and selected placer districts (Ariunbileg and others, 2003).

Key Tectonic Definitions

For the compilation, synthesis, description, and interpretation of metallogenic belts, the following and mineral deposit, metallogenic, and tectonic definitions are employed. The definitions are adapted from Coney and others (1980), Jones and others (1983), Howell and others (1985), Monger and Berg (1987), Nokleberg and others (1994a, b, 2001), Wheeler and others (1988), and Scotese and others (2001).

Accretion. Tectonic juxtaposition of two or more terranes, or tectonic juxtaposition of terranes to a craton margin. Accretion of terranes to one another or to a craton margin also defines a major change in the tectonic evolution of terranes and craton margins.

Accretionary wedge and subduction-zone terrane. Fragment of a mildly to intensely deformed complex consisting of varying amounts of turbidite deposits, continental-margin rocks, oceanic crust and overlying units, and oceanic mantle. Divided into units composed predominantly of turbidite deposits or predominantly of oceanic rocks. Units are interpreted to have formed during tectonic juxtaposition in a zone of major thrusting of one lithosphere plate beneath another, generally in zones of thrusting along the margin of a continent or an island arc. May include large fault-bounded units with a coherent stratigraphy. Many subduction-zone terranes contain fragments of oceanic crust and associated rocks that exhibit a complex structural history, occur in a major thrust zone, and possess blueschist-facies metamorphism.

Collage of terranes. Groups of tectonostratigraphic terranes, generally in oceanic areas, for which insufficient data exist to separate units.

Craton. Chiefly regionally metamorphosed and deformed shield assemblages of Archean and Early Proterozoic sedimentary, volcanic, and plutonic rocks, and overlying platform successions of Late Proterozoic, Paleozoic, and local Mesozoic and Cenozoic sedimentary and lesser volcanic rocks.

Craton margin. Chiefly Late Proterozoic through Jurassic sedimentary rocks deposited on a continental shelf or slope. Consists mainly of platform successions. Locally has, or may have had an Archean and Early Proterozoic cratonal basement.

Cratonal terrane. Fragment of a craton.

Continental-margin arc terrane. Fragment of an igneous belt of coeval plutonic and volcanic rocks, and associated sedimentary rocks that formed above a subduction zone dipping beneath a continent. Inferred to possess a sialic basement.

Deposit. A general term for any lode or placer mineral occurrence, mineral deposit, prospect, and (or) mine.

Island-arc terrane. Fragment of an igneous belt of plutonic rocks, coeval volcanic rocks, and associated sedimentary rocks that formed above an oceanic subduction zone. Inferred to possess a simatic basement.

Metamorphic terrane. Fragment of a highly metamorphosed or deformed assemblage of sedimentary, volcanic, or plutonic rocks that cannot be assigned to a single tectonic environment because the original stratigraphy and structure are obscured. Includes intensely-deformed structural melanges that contain intensely-deformed fragments of two or more terranes.

Metamorphosed continental margin terrane. Fragment of a passive continental margin, in places moderately to highly metamorphosed and deformed, that cannot be linked with certainty to the nearby craton margin. May be derived either from a nearby craton margin or from a distant site.

Oceanic crust, seamount, and ophiolite terrane. Fragment of part or all of a suite of *eugeoclinal* deep-marine sedimentary rocks, pillow basalt, gabbro, and ultramafic rocks that are interpreted as oceanic sedimentary and volcanic rocks and the upper mantle. Includes both inferred offshore oceanic and marginal ocean basin rocks, minor volcaniclastic rocks of magmatic arc derivation, and major marine volcanic accumulations formed at a hotspot, fracture zone, or spreading axis.

Overlap assemblage. A postaccretion unit of sedimentary or igneous rocks deposited on, or intruded into, two or more adjacent terranes. The sedimentary and volcanic parts either depositionally overlie, or are interpreted to have originally depositionally overlain, two or more adjacent terranes, or terranes and the craton margin. Overlapping plutonic rocks, which may be coeval and genetically related to overlap volcanic rocks, link or stitch together adjacent terranes, or a terrane and a craton margin.

Passive continental margin terrane. Fragment of a craton margin.

Post-accretion rock unit. Suite of sedimentary, volcanic, or plutonic rocks that formed in the late history of a terrane, after accretion. May occur also on adjacent terranes or on the craton margin either as an overlap assemblage or as a basinal deposit. A relative-time term denoting rocks formed after tectonic juxtaposition of one terrane to an adjacent terrane.

Pre-accretion rock unit. Suite of sedimentary, volcanic, or plutonic rocks that formed in the early history of a terrane, before accretion. Constitutes the stratigraphy and igneous geology inherent to a terrane. A relative-time term denoting rocks formed before tectonic juxtaposition of one terrane to an adjacent terrane.

Subterrane. A fault-bounded unit within a terrane that exhibit similar, but not identical geologic history relative to another fault bounded unit in the same terrane.

Superterrane. An aggregate of terranes that is interpreted to share either a similar stratigraphic kindred or affinity, or a common geologic history after accretion (Moore, 1992). An approximate synonym is *composite terrane*.

Tectonic linkage. The interpreted association of a suite of coeval tectonic units that formed in the same region and as the result of the same tectonic processes. An example is the linking of a coeval continental-margin arc, forearc deposits, a back-arc rift assemblage, and a subduction-zone complex, all related to the underthrusting of a continental margin by oceanic crust.

Tectonostratigraphic terrane. A fault-bounded geologic entity or fragment that is characterized by a distinctive geologic history that differs markedly from that of adjacent terranes (Jones and others, 1983; Howell and others, 1985).

Transform continental-margin arc. An igneous belt of coeval plutonic and volcanic rocks, and associated sedimentary rocks that formed along a transform fault that occurs along the margin of a craton, passive continental margin, and (or) collage of terranes accreted to a continental margin.

Turbidite basin terrane. Fragment of a basin filled with deep-marine clastic deposits in either an orogenic forearc or backarc setting. May include continental-slope and continental-rise turbidite deposits, and submarine-fan turbidite deposits deposited on oceanic crust. May include minor epiclastic and volcaniclastic deposits.

Geologic Time Scale

Geologic time scale units are according to the IUGS Global Stratigraphic Chart (Remane, 1998). For this study, for some descriptions of geologic units, the term *Riphean* is used for the Mesoproterozoic through Middle Neoproterozoic (1600 to 650 Ma), and the term *Vendian* is used for Neoproterozoic III (650 to 540 Ma).

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