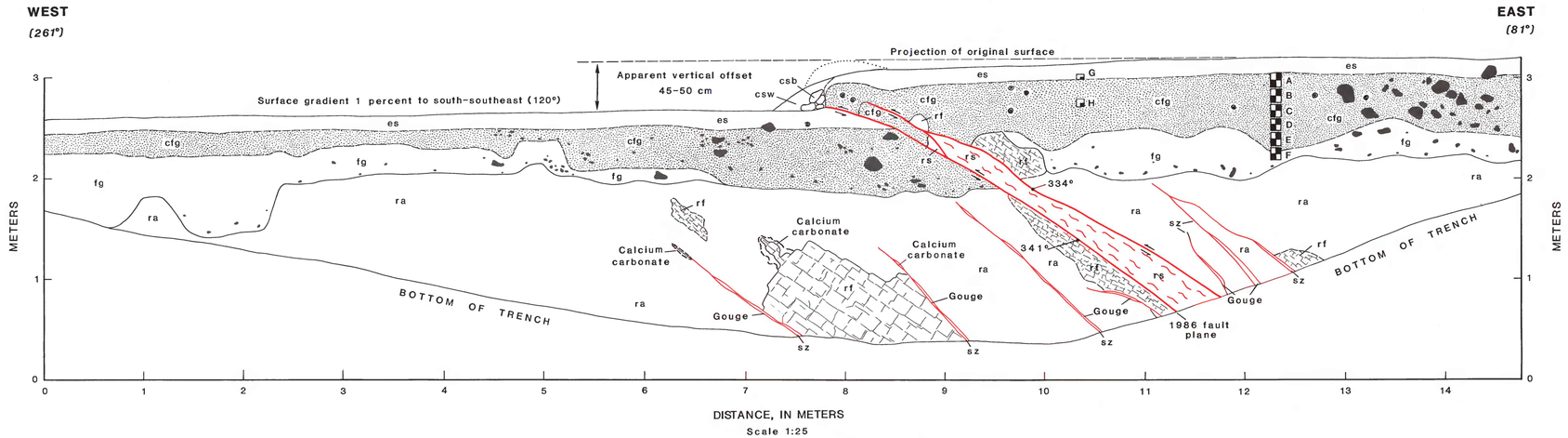
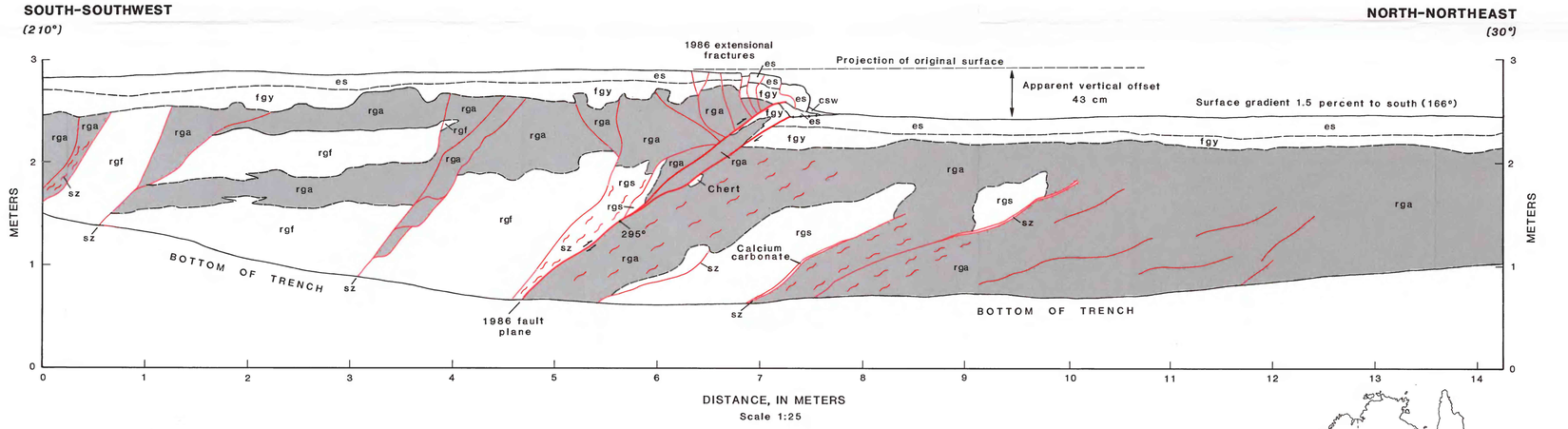
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

BULLETIN 2032–B
PLATE 1



A. MAP OF MARRYAT CREEK SOUTH TRENCH



B. MAP OF MARRYAT CREEK WEST TRENCH

MAPS OF TRENCHES ACROSS FAULT SCARPS, 1986 MARRYAT CREEK EARTHQUAKE, SOUTH AUSTRALIA, AUSTRALIA

By
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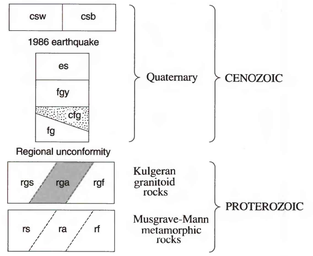
1993

INDEX MAP OF AUSTRALIA

CORRELATION OF MAP UNITS



DESCRIPTION OF UNITS

[This description applies to both trenches, but not all units are exposed in a single trench and significant deviations are present in each trench. A more complete description of units is in the text in the section on "Description of Units Exposed in the Trenches"]

Surficial deposits (Holocene to middle? Pleistocene)—Includes eolian sand, locally derived colluvial and fluvial deposits, and admixtures of these deposits and underlying residual deposits. Absolute age of deposits unknown, although relative stratigraphic position suggests general age relations

Post-earthquake deposits (1986–1990)—Includes localized accumulations of colluvium that were deposited as a result of or after the 1986 Marryat Creek earthquake

csw **Slope-wash colluvium**—Primarily debris shed from collapse and erosion of fault scarp created during the 1986 earthquake

csb **Slump block (colluvial)**—Coherent block(s) of material that slumped from formerly oversteepened scarp. Only recognized in Marryat Creek South trench, where the blocks resemble eolian sand (unit **es**) from which they were derived

Pre-earthquake deposits—Includes ubiquitous mantle of iron-enriched eolian sand and locally derived fluvial and debris-flow deposits

es **Eolian sand (Holocene to middle? Pleistocene)**—Loose to firmly cemented, well-sorted, medium-grained eolian sand. Grains are primarily quartz with iron oxide coatings and cement. Contains upper part of soil

fgy **Young fluvial gravel (latest Pleistocene)**—Poorly sorted angular gravel with sandy matrix. Clasts in gravel reflect local sources of bedrock. Contains lower part of weak soil in Marryat Creek West trench

cfg **Colluvial and fluvial gravel, undifferentiated (middle? to late Pleistocene)**—Poorly sorted angular gravel with sandy matrix. Deposits include possible debris flows, sheetwash colluvium, and fluvial gravel. Contains lower part of moderately developed soil in Marryat Creek South trench

fg **Fluvial gravel (middle? to late Pleistocene)**—Poorly sorted angular gravel with sandy matrix. Clasts in gravel reflect local sources of bedrock. Contains basal part of moderately developed soil in Marryat Creek South trench

Bedrock (Proterozoic)—Includes granitic bedrock (unit rg) exposed in the Marryat Creek West trench (plate 2, map *B*) and adjacent in the area, and greenstone bedrock unit (r) in the Marryat Creek South trench (plate 2, map *A*). Extensive alteration of the granite and greenstone prevents positive identification of their original lithology, but they are probably part of the Kulgeran granitoid rocks and Musgrave-Mann metamorphic rocks as mapped by Conor (1978)

rgs **Sheared granite**—Granite having partly recognizable granitic fabric and mineralogy. Quartz grains are generally recognizable, but feldspar and mafic minerals are completely altered to light-greenish-gray clay

rga **Altered granite**—Granite that has no vestiges of original fabric or mineralogy; extensively altered and sheared into light-greenish-gray clay. Shear fabric is parallel to major faults in trench

rgf **Fractured granite**—Granite that has recognizable fabric and mineralogy. Quartz is fresh, but feldspar and mafic minerals are partially altered

ra **Altered rock (greenstone)**—Greenstone, lacks original fabric, extensively altered and sheared into a light-greenish-gray clay. Contains abundant quartz veins and irregular-shaped masses and veins of calcium carbonate

rs **Sheared rock (greenstone)**—Consists of altered greenstone (unit ra) that has been sheared by brittle deformation. Mapped as separate unit between the two fault planes that were activated in the 1986 earthquake

rf **Fractured rock (greenstone)**—Greenstone, fractured and broken into roughly equidimensional blocks that are commonly 10–15 cm on a side, except adjacent to major faults or shear zones where the blocks are typically 2–3 cm on a side

Fault—Primary planes of movement during 1986 surface faulting event. All are reactivated ancient reverse faults. Arrows indicate relative direction of movement; however, there is probably a significant (subequal) amount of lateral displacement, as indicated by mapping of the surface ruptures. Dot showing value, in degrees, indicates strike of fault at location in trench

sz **Other faults and fractures**—Primarily ancient reverse(?) faults that had no new displacement in 1986 and are entirely within bedrock. Also, in the Marryat Creek West trench (map *B*), includes a network of extensional fractures and a high-angle normal fault (gravitational failure plane) in the overthrust (hanging wall) block

Collapsed fault plane—Stratigraphic contact in the Marryat Creek West trench (map *B*) formed by collapse of fault plane onto pre-1986 land surface

Shear zones—Several centimeter- to several meter-wide zones of extensively sheared and altered bedrock that mark ancient fault zones in Proterozoic rock. In the Marryat Creek South trench (map *A*), the thin zones labeled as gouge have red clayey filling that resemble overlying soil material (Bt horizon) in unit cfg

Contacts

Abrupt—Clearly defined change in texture or mineralogy, generally across boundary <1 cm wide

Gradual—Well-defined change in texture or mineralogy, generally across boundary 1–5 cm wide

Projected—Projection of now-eroded land surface in Marryat Creek South trench (map *A*). Projection is based on uniform thickness of unit **es** and present configuration of contact between units es and cfg

Prominent gravel-size clasts—Location, size, and generalized shape of prominent cobble- to boulder-size clasts in Marryat Creek South trench (map *A*). Rotation of these clasts commonly indicates faulting or position of significant erosional or depositional unconformity

Gastropod shells—Location of land-snail shells in Marryat Creek South trench (map *A*). These snails probably live on shrubs, and their shells litter the land surface at the trench sites. Some shells in the trench may date the enclosing unit, but they may also be intruded (in burrows) and therefore may be substantially younger than enclosing unit

Sample locality—Samples were collected for various purposes and multiple samples were taken from two areas in Marryat Creek South trench (map *A*). Sample numbers and sampling locations given in text table 5

Sample for analysis of grain-size and calcium carbonate content and for uranium-trend dating—Data given in text tables 6 and 8; isotopic data for uranium-trend dating not shown

Sample for thermoluminescence (TL) dating—Analyses were not completed at time of this report

REFERENCE

Conor, C.H.H. compiler, 1978, Witjuti, South Australia geologic map and photomosaic [northeast one-quarter of the Eateringinna 100,000-scale sheet]: Geological Survey of South Australia, Witjuti 5445–I, scale 1:50,000.