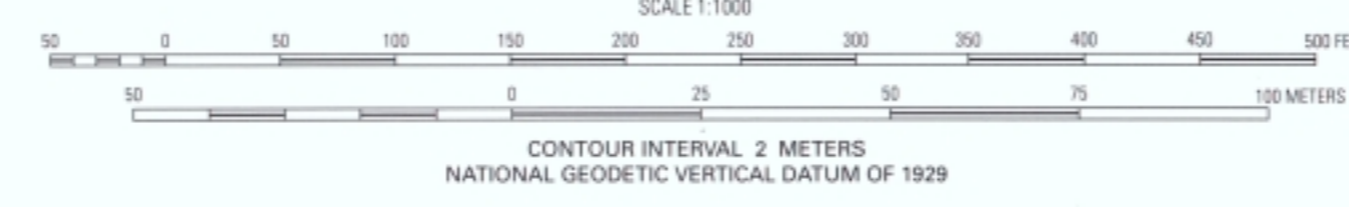
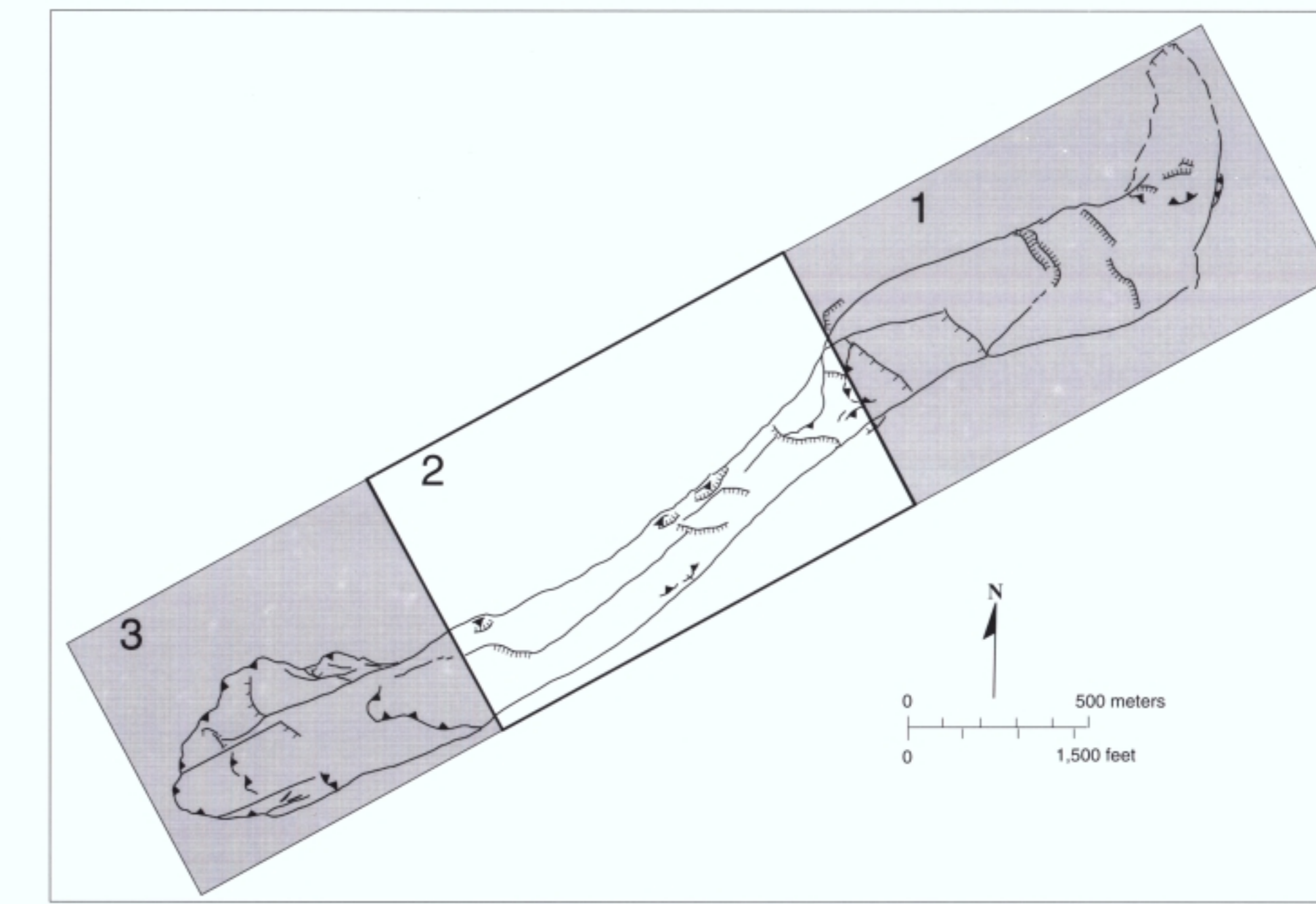


MAP AND DESCRIPTION OF THE ACTIVE PART OF THE SLUMGULLION LANDSLIDE,
HINSDALE COUNTY, COLORADO

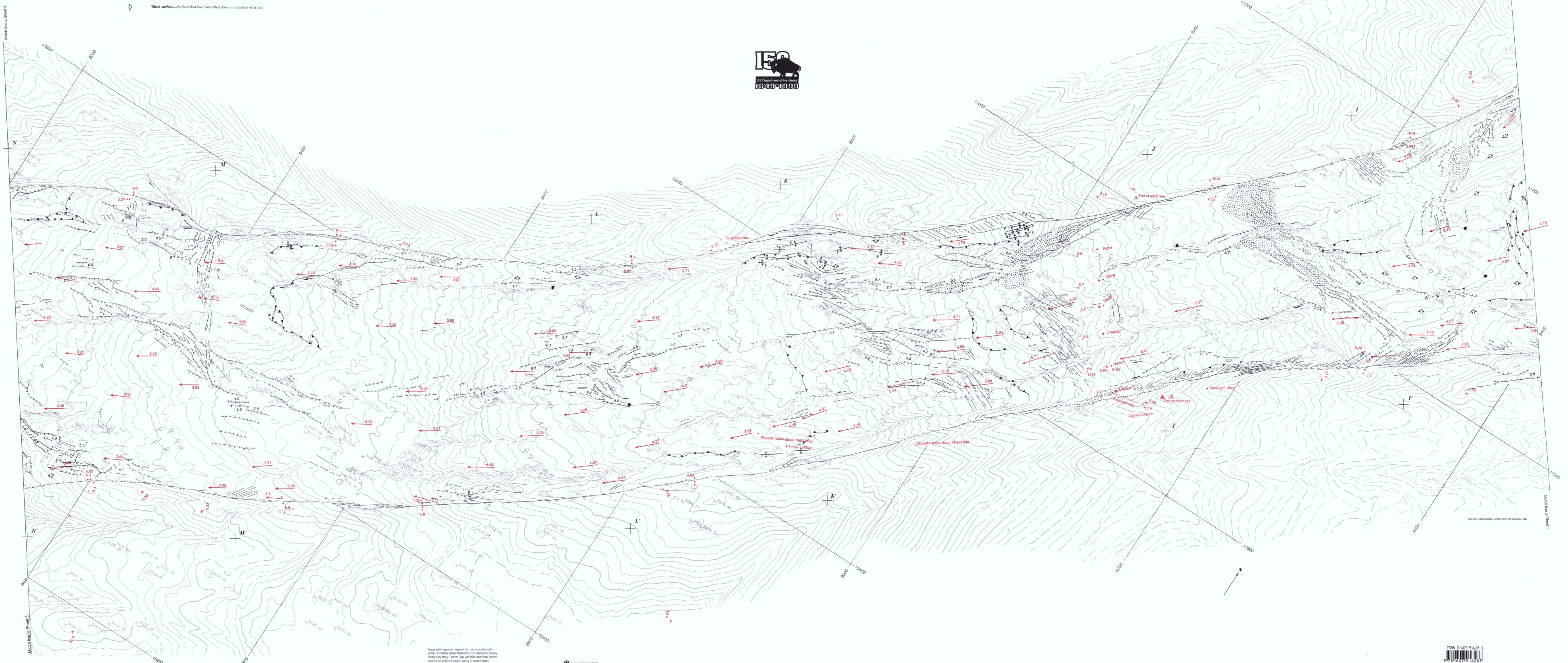
By
Robert W. Fleming and Rex L. Baum, U.S. Geological Survey, and
Marco Giardino, Consiglio Nazionale Delle Ricerche—Centro Studi
1999



EXPLANATION

- Direct indicators of deformation**—Solid line indicates that feature is active and accurately located; dashed line indicates that feature is apparently inactive but accurately located; dotted line indicates feature is inferred both as to location and type of movement.
 - Thrust fault—Shortening feature in which one block of material overrides another. Shown with overthrust block.
 - Fault scarp—Stretching and (or) shear feature. Has a face down slope. Represents a normal or oblique-slip fault. Height in meters given for a few of the scarps. Arrow indicates sense of lateral movement for oblique-slip faults.
 - Fracture—Break in ground surface that is not identifiable as a tension crack or fault. Kinematics may be inferred from other nearby faults and tension cracks.
 - Tension cracks
 - Extremal crack—Extremal (metre-scale) feature having maximum stretch direction normal to trend of crack.
 - En echelon tension cracks—Indicate shear deformation. Sense of shift is determined from stepping direction of individual cracks. Example shown in right-lateral shear. Arrow indicates sense of movement.
 - Segmented strike-slip fault—Strike-slip shear zone manifested at the ground surface as a series of en echelon, overlapping fault segments. Arrow indicates sense of movement.
- Indirect indicators of deformation**
 - Highly fractured area—Intensely deformed area. Fractures too closely spaced to depict on map.
 - Extrusion area—Material from subsurface extruded onto surface of landslide.
 - Buckle fold—Material on landslide surface compressed into a longitudinal ridge about 1 m or less high. Axial line is normal to compression direction.
 - Stretched tree roots—Arrows show direction of stretching.
 - Split tree—Arrows show direction of stretching.
 - Tilted surface—Surface that has been tilted down in direction of arrow.

- Displacement**
 - Displacement vector—Horizontal component of annual displacement shown in meters per year obtained from measurements on aerial photographs taken in 1985 and 1990.
 - Displacement on boundary—Annual displacement between September 1992 and September 1993 in meters per year measured in offset of wooden stakes around landslide perimeter. Letter and number combinations identify station.
 - Displacement of transverse stake line—Positions of rebar stakes in a line crossing narrowest part of landslide. Number indicates average rate of movement in meters per year.
- Position in June 1993**
- Position in September 1996**
- Survey points**
 - Instrument station for survey of line of rebar.
 - Control point for aerial photography.
 - Quadrilateral (or pair of quadrilaterals) where deformation was measured.
- Water**
 - Spring—Location where water from subsurface intersects surface and surface flow begins. Small seeps are incompletely mapped, but springs larger than a few liters per minute are shown.
 - Sink—Location where surface water flows into subsurface. Flow is typically into an open fracture.
- Reference point for features described in text**



Topographic map was prepared from aerial photographs, scale 1:50,000 by James Macintosh, U.S. Geological Survey, Denver Laboratory, Denver, Colorado. Aerial photographs were established by David Warner, Survey of Control Points, annual landslide perimeter.