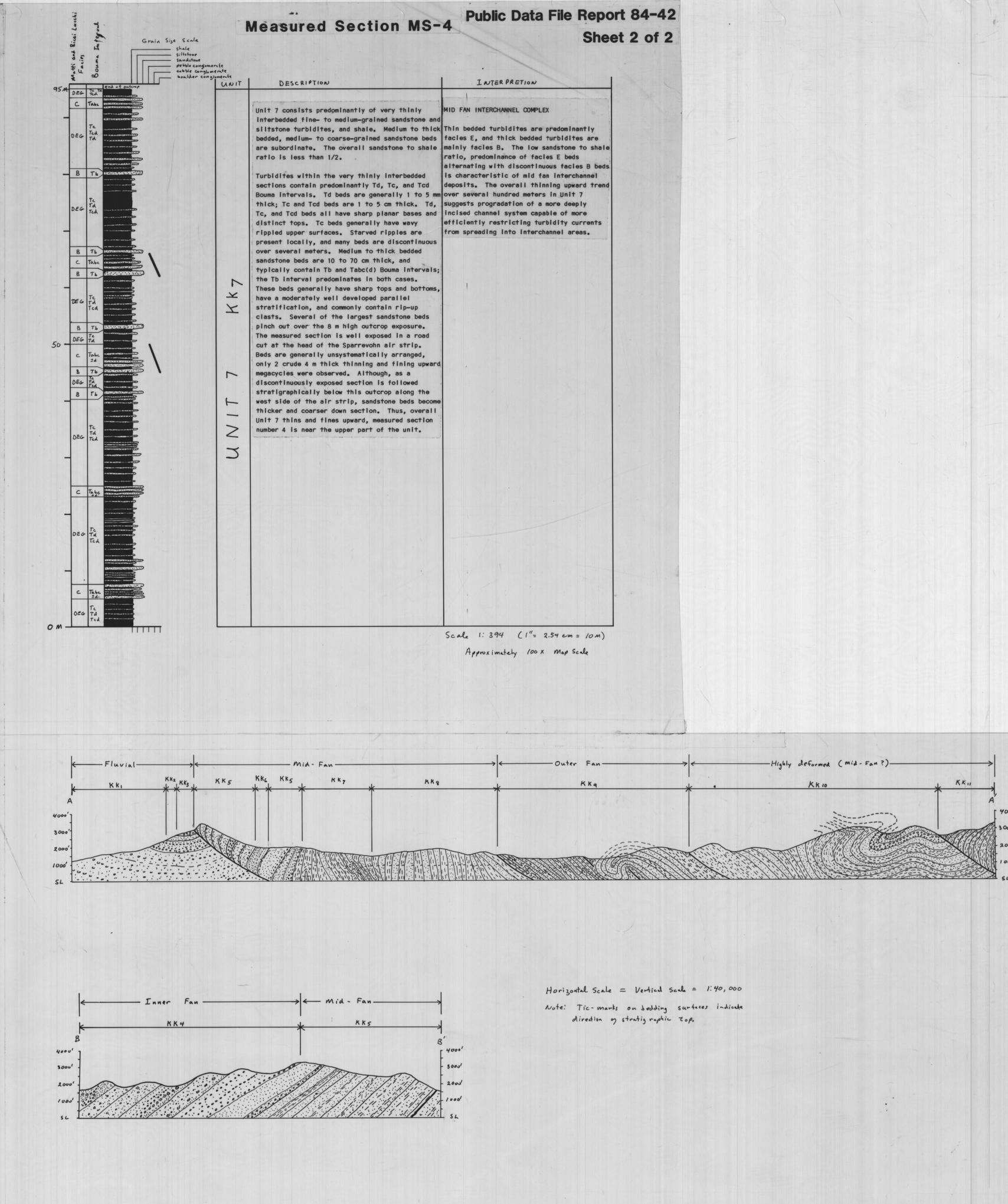
| Measured Section MS-1 | | Grain Size Scale Shale | Measured Section MS | 5-3 |
|---|---|--|---|---|
| of very thick bedded (10 to 30 m) pebbly to bouldery sandstone and conglomerate. Beds are very poorly exposed, and the "measured" section was estimated using limited outcrop, rubblecrop, weathering topography, and information borrowed from better exposures on adjacent ridges. Beds typically have a thin inversely graded base and a thick normally graded top. Clast supported conglomerate only occurs in the coarsest part of a bed, generally near its base. In general, very | of any fluvial characteristics other than coarse grain size and poor sorting, and the thick systematically graded beds with shale and turbidite rip-up clasts suggest proximal deep marine sedimentation. The plane parallel stratification, inversely graded | Sandstone pebble conglomerate coble conglomerate boulder conglomerate boulder conglomerate A a Occorrent A a Occorrent | The upper part of Unit 5 consists of very thick bedded sandstone and pebbly to cobbly sandstone packages 3 to 30 m thick alternating with very thin to medium bedded sandstone turbidites and shale packages 1 to 10 m thick. The overall sandstone to shale ratio is very high, approximately 30. The very thick bedded | MID-FAN CHANNEL - LEVEE COMPLEX. Alternating packages of facies E dominant turbidites and facies A dominant massive sandstone are typically formed by overbank sedimentation and the filling of abandoned shallow distributary channels in the mid-fan depositional environment. |
| poorly sorted pebbly sandstone predominates with clasts becoming larger and more abundant toward the base. Platy clasts are typically oriented with their c-axes (shortest) perpendicular to bedding and their a and b axes unoriented in the plane of the bedding, producing a distinct parallel foliation. Large scale cross stratification, pebble trains, sandstone lenses, internal channeling, and sharply contrasting grain size discontinuities are noticeably absent. Clasts are generally subangular to rounded and consist prodominantly of dark gray to black sedimentary rock fragments—mainly argillite, shale, siltstone, chert and sandstone. White grains of quartz, feldspar, quartzite, and felsic igneous rock fragments are subordinate, and green | and typically non clast supported "conglomerate" suggest deposition by grain flow mechanisms. | COVERED A COVERED COVERED A COVERED COVERED A COVERED | identification of large scale megacycles. At outcrop scale, no repeated cycles are apparent. | |
| chert and volcanic rock fragments are minor. Carbonate clasts and calcareous siltstone weather into recesses and normally comprise less than one percent of the rock, but in the lower most bed in Unit 4, carbonate grains comprise up to 10 percent of the rock. No high grade metamorphic rock fragments were observed. | | A a a a a a a a a a a a a a a a a a a a | medium bedded sandstone turbidites and shale, interbedded with very thick bedded sandstone and pebbly sandstone. The overall sandstone to shale | MID FAN LEVEE COMPLEX The very thick bedded sandstone beds are assigned to the A, B, and C facies of Muttinand Ricci Lucchi, 1972; facies A |
| | | Tc Tcd EG Tbcd Tabed Tabed Tabed | thickness and sandstone to shale ratio decreases up section. The very thick bedded sandstone beds are generally graded form very coarse-grained sandstone and grit with pebbles common at the base, to fine or medium grained sandstone with scattered small pebbles at the top. The sandstone is poorly sorted near the base and moderately to moderately well sorted near the top. Oversized shale rip-up clasts are common near the bases of beds, and are locally common at higher horizons within beds. Sandstone beds generally have sharp planar bases and tops, only very rarely were concave upward (channelized) | predominates. The very thin to medium bedded sandstone turbidites are assigned to facies C, D, and E; facies E predominates. Approximately 20 percent of Unit 6 is hemipelagic shale of facies G. In outcrop, the 2 types of sandstone beds, mainly facies A verses mainly facies E, are distinctive and were produced by 2 different depositional processes. The thin to medium bedded facies E beds are typical overbank deposits, produced by deposition from the sediment "cloud" that fills the basin during turbidity current intervals. The thick bedded facies A beds are probably channel splay deposits, formed by portions of the main turbidity current that broke through |
| Unit 5 consists of thick bedded moderately sorted coarse— to medium—grained sandstone with common shale rip—up clasts and sparse pebbles. The moderate sorting of Unit 5 in this area contrasts strongly with very poor sorting of Unit 4. Below the "measured" section, the rocks resemble the rocks of Unit 5 in measured section number 2. | INNER FAN CHANNEL-LEVEE COMPLEX See Unit 5, measured section number 2 for discussion. Scale 1: 394 (1"= 2.54 cm = 10 m) Approximately 100x map scale | TANCA TO THE PARTY OF THE PARTY | Tab, and Tabc(d) beds (see lower Unit 5 for description) are most common but are thinner, 1 to 3 m, than in lower Unit 5. Interbedded sandstone turbidites and shale can be divided into 2 packages: an upper package of very thin to thin bedded trubidites having a sandstone to shale ratio of less than 2, and a lower package of thin to medium bedded turbidites having a sandstone to shale ratio of greater than or equal to 2. The boundary between packages 1 and 2 is approximately the location of the Inoceramus locality at 248 m. Repeated thinning upward megacycles, 3 to 8 m thick, occur near the top of the upper package. In both packages, turbidites consist predominantly of Tc and Tcd | |
| Grain Size Scale Grain Size Scale Shale Sithstone Sand Stone Sand Stone South Conglomenate Cobble Conglomenate Cobble Conglomenate | .2 | E Inoceramus | Deds 1 to 4 cm thick, and Tbc, Tbcd, Tabc, and Tabcd beds 10 to 50 cm thick. Tc and Tcd beds have sharp planar bases and wavy tops, they pinch and swell, and are discontinuous over a several meter interval. Turbidites with upper flow regime bases (Ta or Tb) have sharp, generally planar tops and bases, they pinch and swell along strike, and are discontinuous over a tens of meters interval. The composition of the sandstone in Unit 6 is indistinguishable from the sandstone of Unit 5. Shale beds range in thickness from 1 cm to 1 m, and consist of thinly interlaminated shale and fine-grained sandstone to siltstone turbidites. The turbidites are 1 mm to 1 cm thick and consist of Tc, Td or Tcd Bouma intervals, commonly with | |
| The upper part of Unit 5 consists of very thick bedded sandstone and pebbly to cobbly sandstone packages 3 to 30 m thick alternating with very thin to medium bedded sandstone turbidites and shale packages 1 to 10 m thick. The overall sandstone to shale ratio is very high, | INTERPRETATION MID-FAN CHANNEL - LEVEE COMPLEX. Alternating packages of facies E dominant turbidites and facies A dominant massive sandstone are typically formed by overbank sedimentation and the filling of abandoned shallow distributory channels in the mid-fan depositional environment. | C,O Ted The | planar bases and wavy tops. Lenticular bedding and starved ripples are common locally. | |
| abundant cobbles in a sand or locally mud matrix. The mud matrix is actually shale rip-up clasts squashed between clasts to resemble a muddy matrix. Poor exposures and the occurrence of amalgamated beds precludes the identification of large scale megacycles. At outcrop scale, no repeated cycles are apparent. | | C Ta-d C Ta-d C Ta-d C Ta-d A b | of very thick bedded (1-10 m) sandstone and pebbly to cobbly sandstone interbedded with shale rip-up beds and black shale. The overall sandstone to shale ratio is very high, | MID-FAN CHANNEL-FILL SYSTEM The sandstone beds of lower Unit 5 are assigned to the A, B, and C turbidite facies of Mutti and Ricci-Lucchi, 1972. Classic examples of each facies are well |
| A To DEC 15 TO BD TS ECO TO A To | | B | Sandstone beds are generally graded form very coarse-grained sandstone and grit with abundant pebbles and/or cobbles at the base, to fine or medium grained sandstone with sparse small pebbles at the top. The sandstone is poorly sorted near the base and moderately to moderately well sorted near the top. Oversized shale rip-up clasts are common near the bases of beds, and are locally common at higher horizons within beds. Sandstone beds generally have sharp planar bases and tops, only very rarely were concave upward (channelized) bases observed. Poor exposure and the common occurrence of amalgamated beds precludes the identification of characteristic megacycles or the determination of lateral | represented, but more importantly, beds gradational between the end member facies occur, indicating a continuum of depositional processes. Beds consisting entirely or predominantly of the Ta interval are assigned to Facies A. Beds consisting entirely or predominantly of the Tb interval are assigned to Facies B. Beds with a recognizable Tc interval are assigned to facies C. Ta intervals were probably produced by very rapid deposition without traction transport of sediment being carried by debris flow or grain flow mechanisms. Tb intervals were probably produced by rapid deposition with upper flow regime traction transport of sediment being carried by grain |
| 76 76 76 76 76 76 76 76 76 76 76 76 76 7 | | A a a a a a a a a a a a a a a a a a a a | subangular to rounded and consist predominantly of dark gray to black sedimentary rock fragments—mainly argillite, shale, siltstone, chert and sandstone. White grains of quartz, feldspar, quartzite, and felsic igneous rock fragments are subordinate, and green chert and volcanic rock fragments are minor. Carbonate clasts and calcareous siltstone weather into recesses and comprise less than one percent of the rock. No high grade metamorphic rock fragments were observed. Using Bouma divisions (whether technically applicable or not), sandstone beds in the lower | flow or high density turbidity current mechanisms. To intervals were probably produced by deposition with lower flow regime traction transport of sediment being carried by turbidity current mechanisms. The shale rip-up beds are assigned to facies F. Rip-up beds are chaotic mixtures of sandstone and shale probably produced by submarine intrabasinal slumping and sliding of levee deposits. The shale beds are hemipelagic deposits representing suspension deposition between turbidite intervals and are assigned to facies G. Very thin (mm scale) turbidites interlaminated with the shale beds are |
| A TA DEC TA A TA DEC TETA BD Th BC TA DEC TA A TA DEC TA B TA DEC TA A TA DEC TA B TA DEC TA A TA DEC | | A a a a a a a a a a a a a a a a a a a a | of massive, graded sandstone and pebbly to cobbly sandstone with an isotropic fabric and no discernible internal structure. Tab beds consist of a lower Ta interval, as just described, and an upper crudely to moderately well stratified Tb interval. The Ta interval generally predominates. Within the Tb interval, platy clasts, shale rip-up trains and carbonate cemented laminations are generally oriented parallel to the stratification. Tabc(d) beds consist of Ta and Tb intervals as described above, overlain by a relatively thin Tc interval consisting of ripple drift cross laminations and locally convolute laminations. The top of the Tc interval generally preserves the ripple form; | |
| Ta Ta Ta | | - A a | troughs are typically filled with hemipelagic shale, or less commonly by plane laminated siltstone or very fine grained sandstone of the Td interval. One typical Tabcd bed consists of Ta = 3 m, Tb = 30 cm, Tc = 3 cm, Td = 1 to 2 cm. No Te interval was recognized in lower Unit 5. Shale rip-up beds are chaotic deposits composed of intermixed sandstone matrix and shale clasts. Rip-up beds range in thickness from 10 cm to 2 m, generally have planar upper and lower contacts, and are discontinuous along strike. Shale beds range in thickness from 1 cm to 1 m, and consist of thinly interlaminated shale and fine-grained sandstone to siltstone turbidites. The turbidites are 1 mm to 1 cm thick and consist | |
| DEG TO TA DEG TOTA A TA DEG TOTA A TA | | C a a a a a a a a a a a a a a a a a a a | of Tc, Td or Tcd Bouma intervals, commonly with planar bases and wavy tops. | |
| DEG TCA A Tab DEG TE TA A Tab DEG TE TA A Tab B Tab DEG TE TA B Tab DEG TE TA Tab DEG TE Tab DEG | | B a | | |
| OM A TO | Scale 1:394 (1"= 2.54 cm = 10 m) Approximately 100 x map Scale | A a | | Scale 1:394 (1"= 2.54 cm = 10M) Approximately 100 x Map scale |



EXPLANATION

| | Map Units | | Map Symbols | |
|----|---|--|--|--|
| | Bedded Rocks | | | |
| | | | Location and number of measured section | |
|] | Fluvial conglomerate: Very poorly sorted interbedded conglomerate and lenticular | / | | |
| | sandstone. Sedimentary features include | 24 | Bedding | |
| | trough cross bedding, pebble trains, channelized bases and imbricate pebbles | 13) | | |
| 7 | Fluvial sandstone: Very poorly exposed, pourly | 50) | . Approximate bedding | |
|] | sorted sandstone and pebbly sandstone. | 78 | 8 overturned bedding | |
| 7 | Fluvial conglomerate: Similar to KKI | | | |
| 1 | | | So Overturned bedding with tops known from sedimentary features. | |
| 7 | Inner fan Sandstone and conglomerate: See | | (24) | |
| 1 | Measured section No. 1 for description. | and the second s | Paleo current direction corrected for simple tilt showing original dip of cross bedding where applicable | |
| 7 | Mid- Fan Channel - Levee Complex: See | | Control Point. | |
| 7 | Measured Sections Nos. 1, 2, 3 for description. | | control Point. nobservation station where no structural data was collected. | |
| 7 | Mid - Fan Levee System: See Measured | | | |
|] | Section No. 3 for description. | | Contact - intrusive or depositional, continuous where Known, dashed where projected. | |
| 7 | Mid-Fan Interchannel Deposits: See | | | |
| | Measured section No. 4 for description. | | Fault of un known type - continuous where known, charles where projected | |
| 7 | Mid- Fan Channel-Levee Complex: Consists of | | | |
| | interbedded sandstone and shale. Although poorly | | ?' Thrust fault with triangle on upper plate. Line is | |
| | exposed, individual sends tone beds or packages | | Thrust fault with triangle on apper plate. Line i. Continuous where known, dashed where projected and | |
| | of beds form linear topographic highs. Where exposed, sedimentary features are similar to | | querried where hypothesized. | |
| | Unit 5 - KK 5. | 7 | Anticline | |
| ٦ | Outer Fan (?) Sandstone and Shak: Laterally | | | |
| J | Continuous sheet sandatone. Dominantly Facies B and C in high ss/sh ratio section, and | 23 | Overturned auticline showing direction of plunge | |
| | Facies C, D and & in low 55/54 ratio sections. | | | |
| 7 | | × | Overturned syncline chowing direction of plunge | |
| 11 | Highly dyformed Mid (or Outer (?)) Fan Sandstone | | | |
| 15 | and Shale. | | Measured Section Symbols | |
| | T 1 . 2 . | | Massive Sandstone | |
| _ | Intrusive Rocks Rhyolite and voryfine grained gravite | | ?ebbly massive Sandstone | |
| | , your and only your | | Parallel lamineted sandstone | |
| | | | 2000 Conglo merate | |
| | | | Silts tone | |
| | | | 'shale | |
| | | | shale ripups | |
| | | | | |
| | | | 6 concretions | |