

PLATES

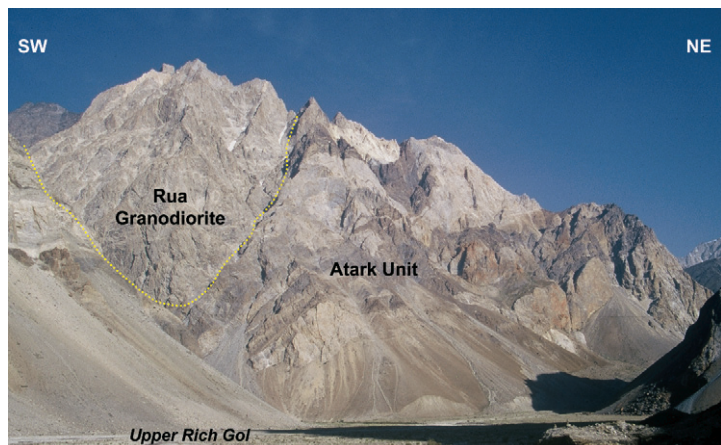


Plate 1 - Intrusive contact between the Rua Granodiorite and isoclinally folded layers of the Atark Unit in the upper Rich Gol. September 1999.

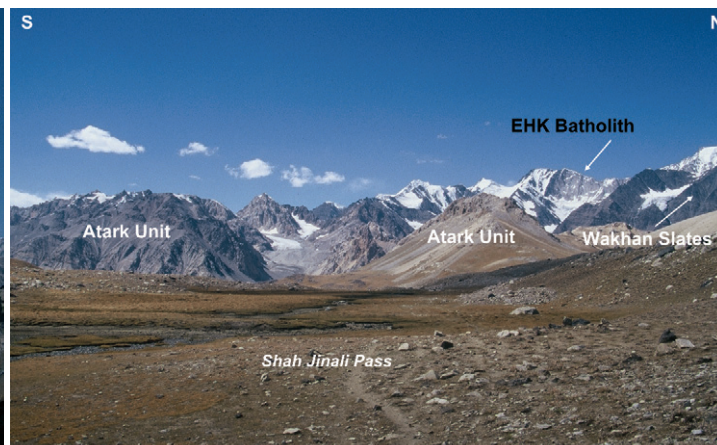


Plate 2 - View to the west of East Hindu Kush from the Shah Jinali Pass, with the Wakhan Slates overthrusting the Atark Unit and the high peaks formed in the EHK Batholith along the Pakistan-Afghanistan border. September 1999.



Plate 3 - Intrusive contact of the Shushar Granite into the Wakhan Slates north of Inkip, Yarkhun Valley. Note slates septa in the background. Whitish quartzarenitic layers occur within the slates. September 1999.

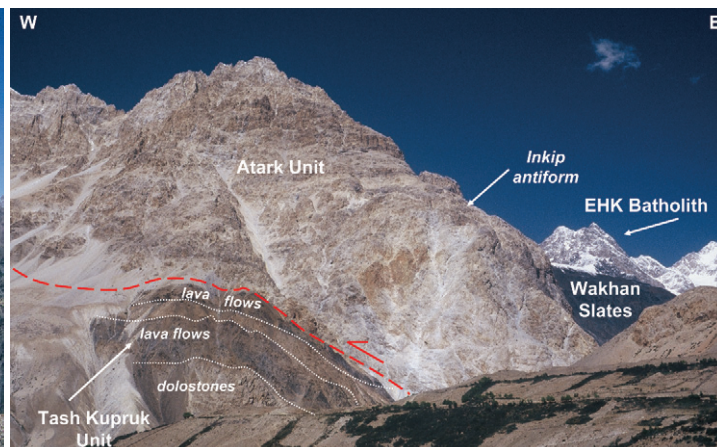


Plate 4 - High angle S-SW-verging thrust juxtaposing the massive limestones of the Atark to the dolostones and lava flows of the Tash Kupruk Unit. This fault marks the boundary between Karakoram and East Hindu Kush. View from Inkip. September 1999.

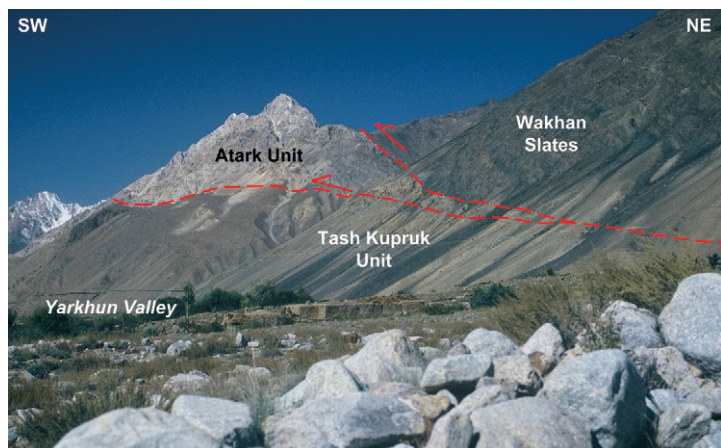


Plate 5 - Eastward closure of the Atark Unit along the Yarkhun Valley, where the Wakhan Slates directly overthrust the Tash Kupruk Unit. View to the NW from Ghararam, Yarkhun Valley. September 1999.



Plate 6 - The Atark Unit in the Uzhnu Gol; view to the west from the Rich Gol. The Shah Jinali Phyllite are exposed along the lower part of the valley. September 1996.



Plate 7 - Close view to the carbonate succession of the Atark Unit along the Uzhnu Gol; view to the west. July, 1990.



Plate 8 - Severely deformed metabreccia with flattened and elongated pebbles along the lower part of the Shah Jinaly Gol downstream to the Shah Jinali summer village; Lucia Angiolini for scale. September 1999.



Plate 9 - General view to the N across the northern boundary of Karakoram up to the Kan Khun Unit from the Vidiakot ridge, Baroghil area. The Wakhan Slates and the Tash Kupruk Unit are exposed in the lower part of the imbricates. Note a widespread rock-glacier covering the valley, September, 1999.



Plate 10 - The Kan Khun Unit from the continental divide; view to the NE on the Afghan side of the belt, September 1999.

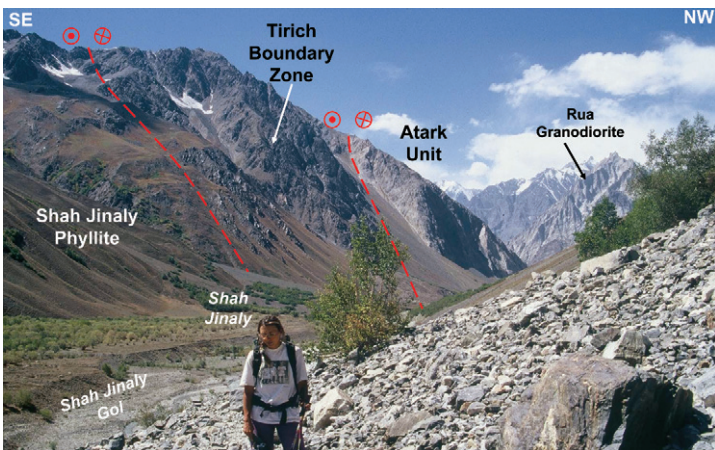


Plate 11 - The Tirich Boundary zone along the lower part of the Shah Jinaly Gol. Note vertical contacts with the Shah Jinaly Phyllite and with the Atark Unit, suggesting strike-slip movements; view to the SW, Lucia Angiolini for scale. September 1999.

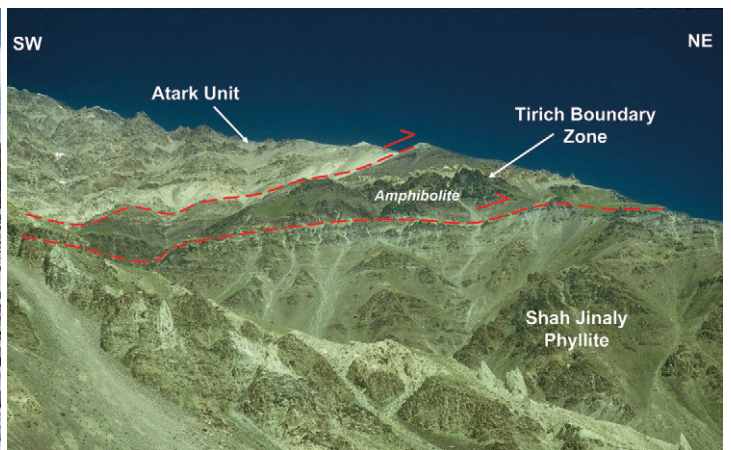


Plate 12 - The Tirich Boundary Zone along the right side of the Rich Gol; view to the NW from Uzhnu. The TBZ is tectonically sandwiched between the Atark Unit (top) and the Shah Jinaly Phyllites (bottom). July, 1990.



Plate 13 - The Shah Jinali Phyllites close to Shah Gharil along the top of the Shah Jinali Gol; the Tash Kupruk Unit is in the background. View to the S, September, 1996.

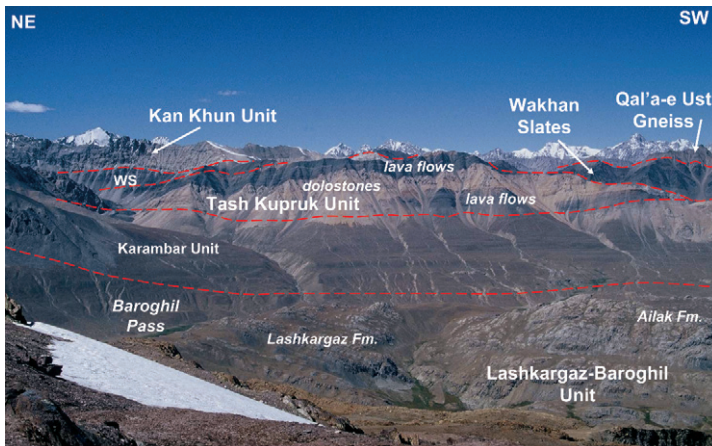


Plate 14 - The Tash Kupruk Unit above the Baroghil Pass on the Afghan side of the belt. The unit is overthrust by the Kan Khun thrust sheet on the left side, and by the Qal'a-e Ust Gneiss on the right side. The Wakhan Batholith in the background; view to the N from the ridge in front of Baroghil, September, 1996.

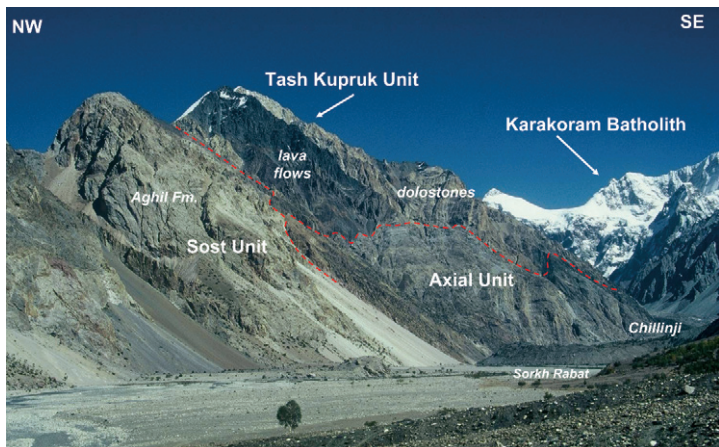


Plate 15 - The Tash Kupruk «klippe» at Chillinji, Karambar Valley. View to the east. Dark lava flows and yellowish dolostones tectonically overlie white carbonates of the Axial Unit. The front of a big nameless glacier (foreground) is going to dam the valley at Sorkh Rabat, September, 1999.

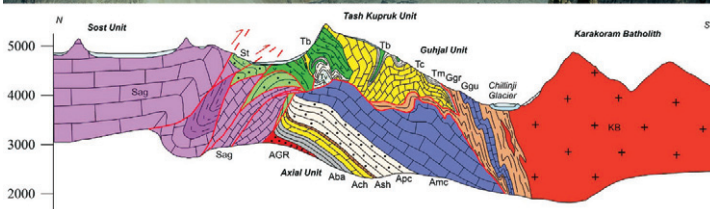


Plate 16 - General view of the Chillinji structure from the ridge in front of Chillinji, right side of the Karambar Valley, September, 1999.



Plate 17 - Panoramic view from the ridge above Inkip on the Kan Khun structures. The Tash Kupruk Unit shows a close synform and in turn overthrusts the Axial Unit along the Reshun Fault. The pre-Ordovician crystalline basement of Karakoram is shown in the background. View to the N-NE, September, 1996.



Plate 18 - Cherty limestones with volcanoclastic layers close to the Shah Jinali Pass. September, 1996.

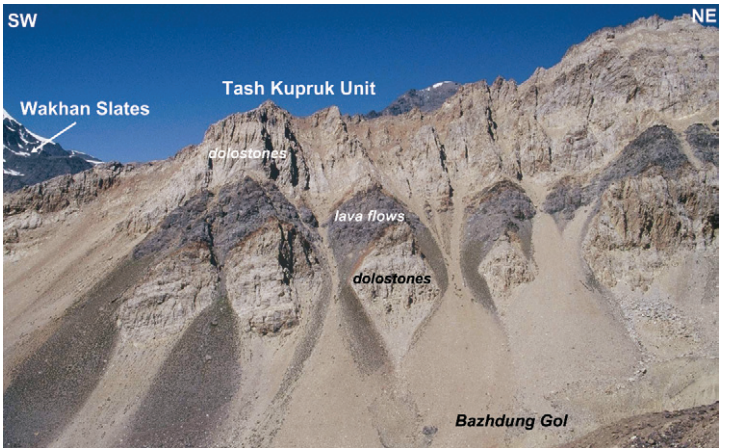
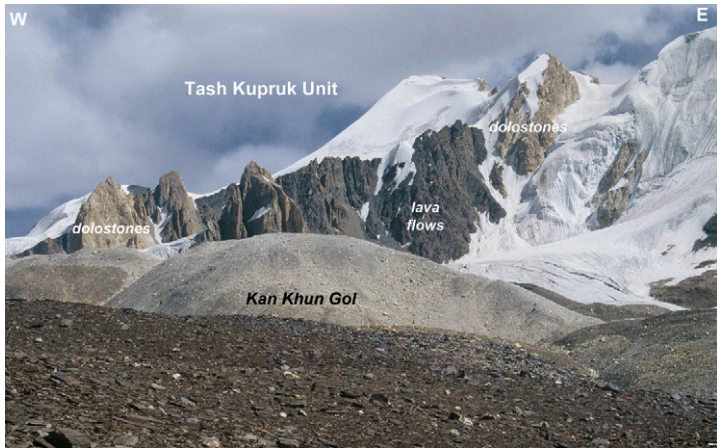


Plate 19 - The Tash Kupruk Unit along the head of the Kan Khun Gol, with thick lava flows alternated with yellow dolostones typical of this thrust sheet. September 1999.

Plate 20 - Lava flows interbedded with yellowish Middle Devonian carbonates of the Tash Kupruk Unit above Kan Khun, Bazhdung Gol. September, 1996; view to the NW.

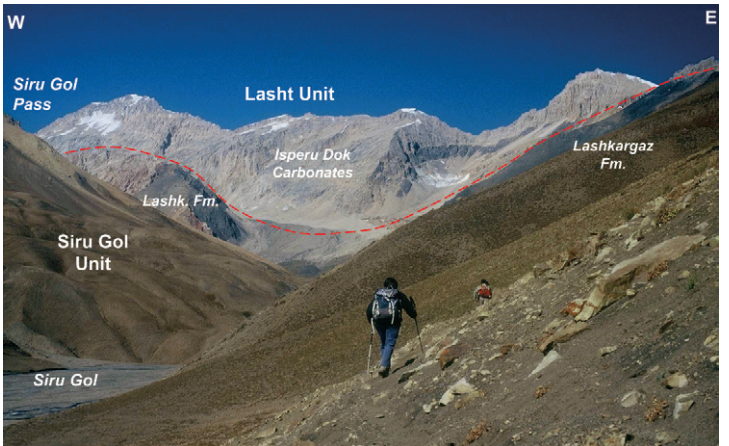
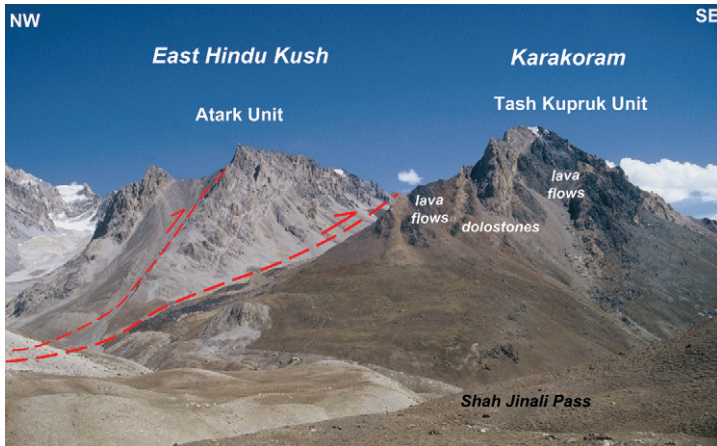


Plate 21 - The Tash Kupruk Unit north of the Shah Jinali Pass. Note vertical attitude of the unit with thick intercalations of lava flows and massive carbonates. The Atark Unit of East Hindu Kush is exposed in the background. September, 1996; view to the N-NE.

Plate 22 - Upper reaches of the Siru Gol. The Permo-Triassic thick bedded carbonates preserve also a black strip, few tens of m thick, unfortunately not reached during our survey. Lia Gaetani for scale, September, 1999.

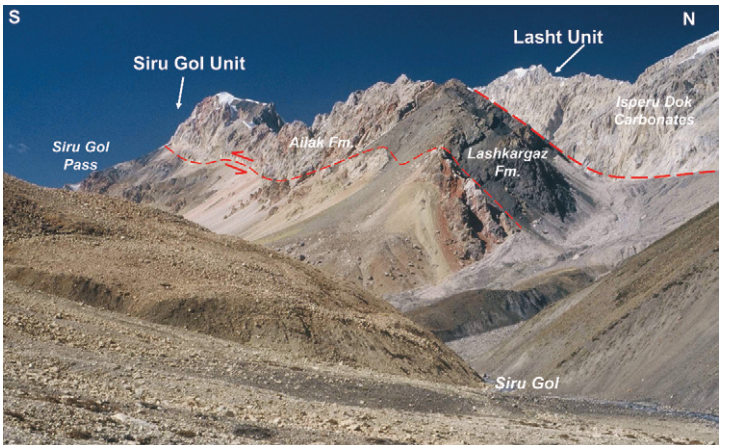
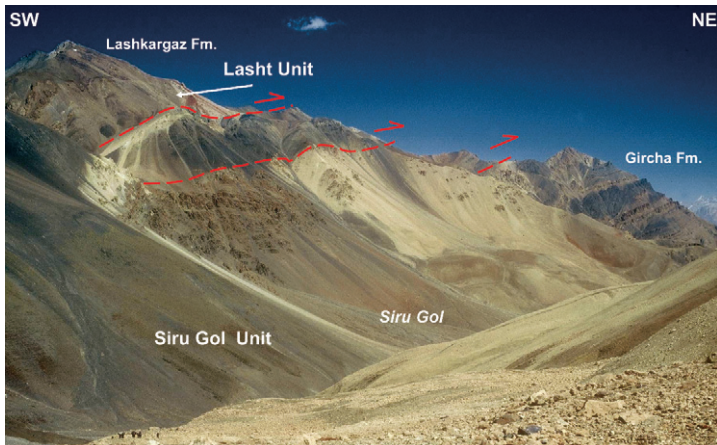


Plate 23 - The left side of the upper Siru Gol showing the SE verging thrust system stacking the Lasht Unit, here represented by black slates, onto the Gircha Fm. of the Siru Gol Unit. A footwall syncline is exposed below the main thrust on the right side in the background. View to the E-NE, September, 1999.

Plate 24 - NE-SW trending vertical faults deforming stratigraphic contacts among the Permo-Triassic units of the Siru Gol thrust sheet, just east of the Siru Gol Pass. View to the NW, September, 1999.

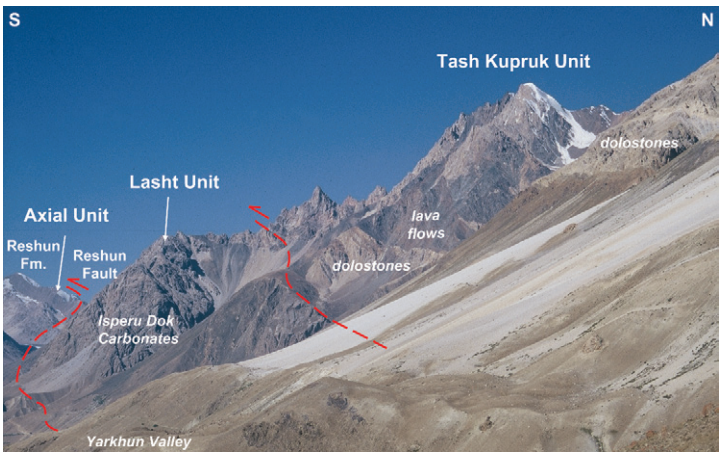
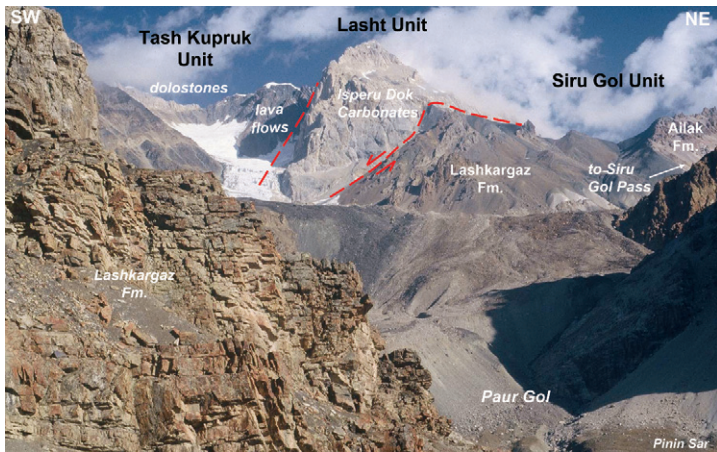


Plate 25 - View to the north from the upper Paur Gol. Permian limestones of the Lashkargaz Fm. belonging to the Siru Gol Unit are exposed in the foreground. The Tash Kupruk Unit, here rich in lava flows and dolomitic layers, forms the background. September, 1999.

Plate 26 - Tectonic contact between the Tash Kupruk Unit in the hanging wall of the main thrust plane and massive carbonates of the Lasht Unit in the footwall. September, 1996.

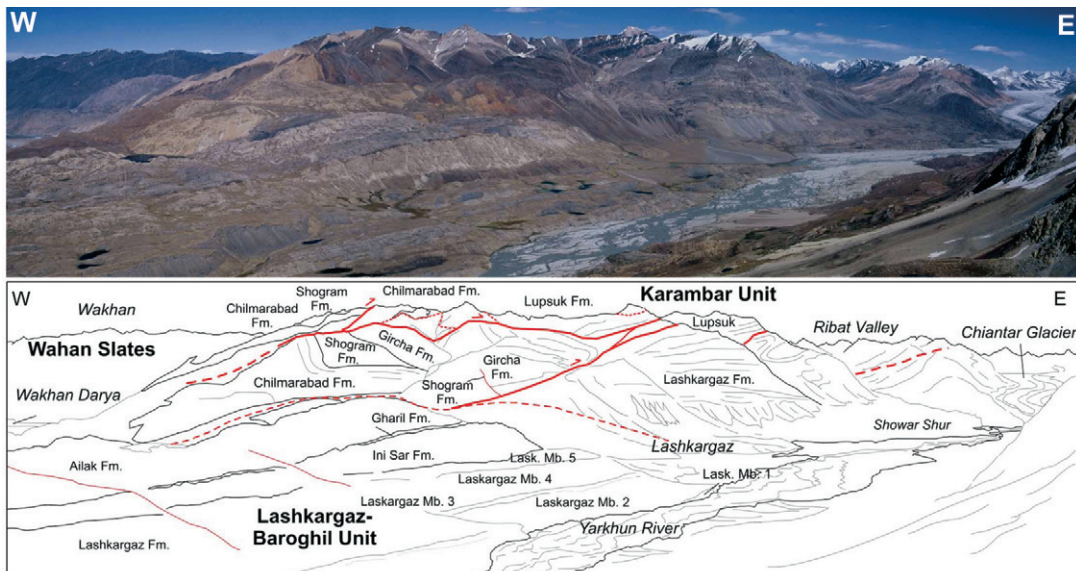


Plate 27 - General view of the Lashkargaz-Baroghil Unit around the village of Lashkargaz, upper Yarkhun Valley. September 1996.

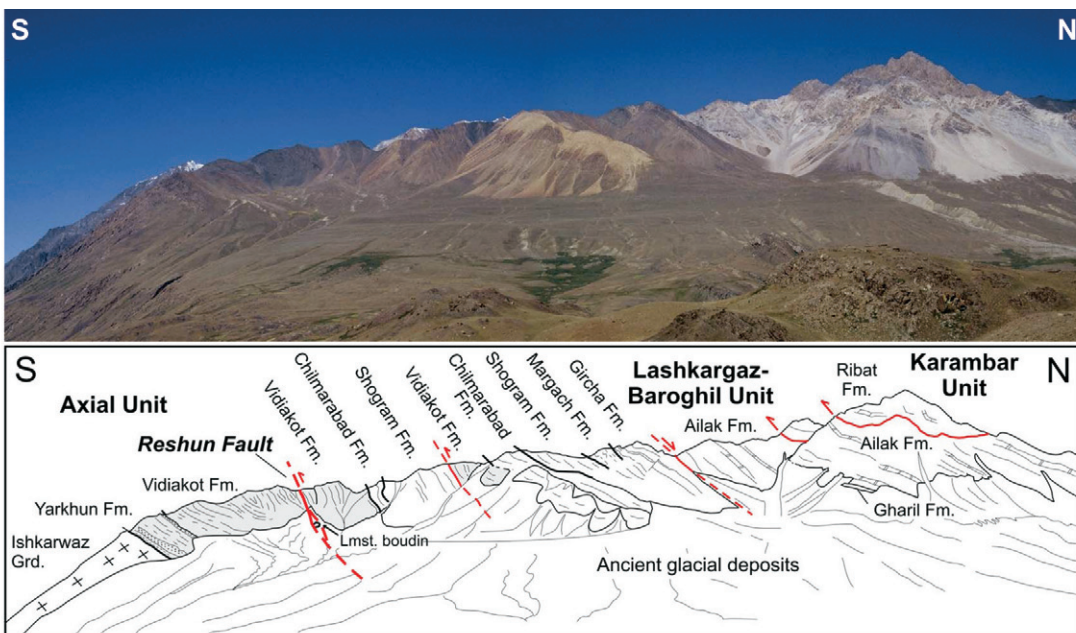


Plate 28 - The Vidiakot ridge from the upper Barbin Valley, view to the W-NW, September, 1996.

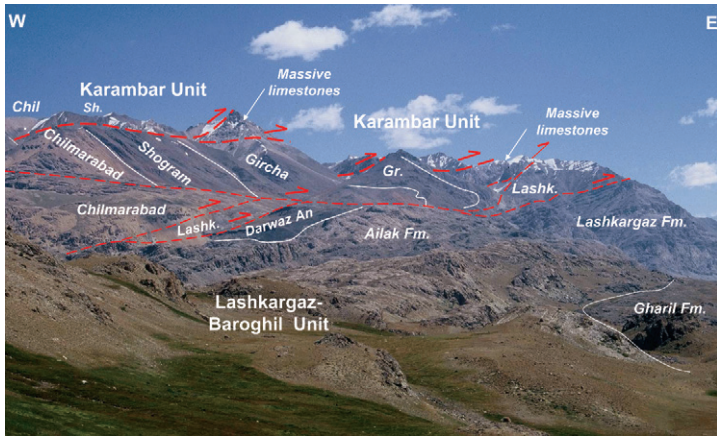


Plate 29

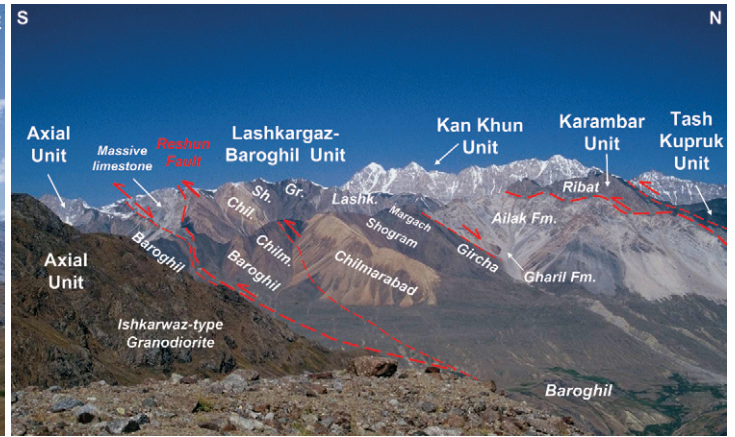


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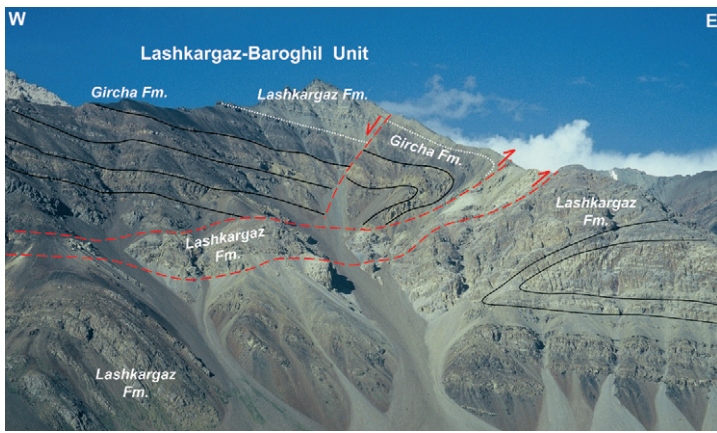


Plate 31



Plate 32

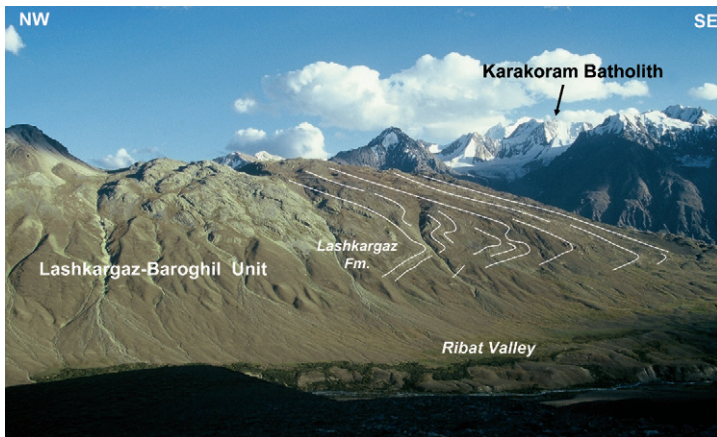


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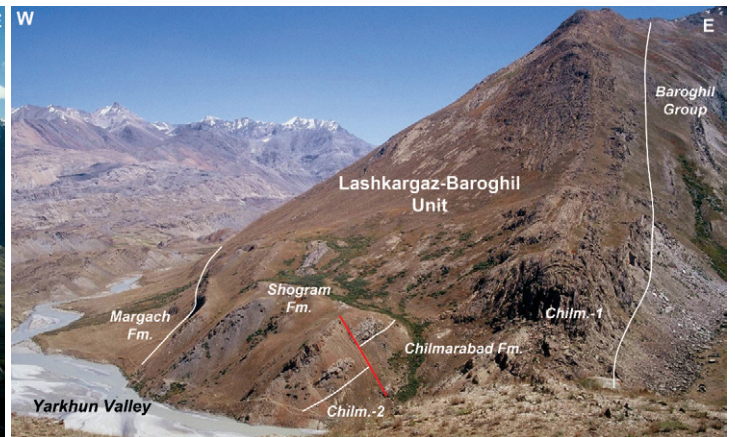


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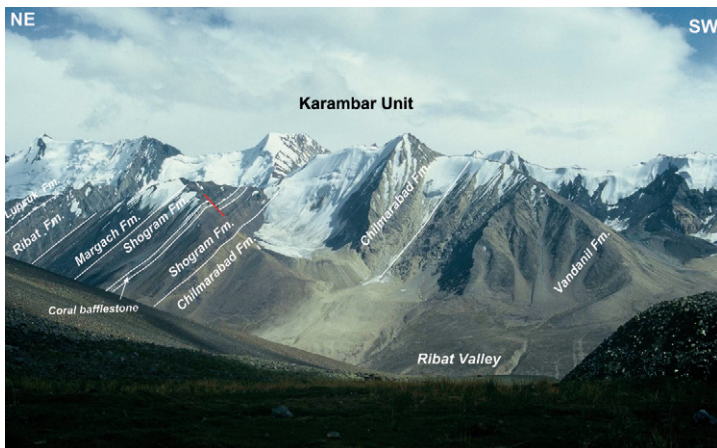


Plate 35

Plate 29 - The central portion of the Lashkargaz-Baroghil Unit above Lashkargaz close to the Darwaz Pass. The Permo-Triassic carbonates of the Ailak Fm. show on top grey limestones of the Darwaz An Fm., which are overthrust by Devonian and Carboniferous units. September, 1996.

Plate 30 - The central part of the Vidiakot ridge succession. A tectonic slice of white Permian limestone can be recognized along the Reshun Fault in the background. September, 1996.

Plate 31 - Close view to the main thrust plane of fig. 28.

Plate 32 - Duplexes between the Karambar and Lashkargaz-Baroghil thrust sheets. Folded layers of the Shogram and Chilmarabad (background) formations overthrust three minor thrust slices consisting of the Permian limestones of the Lashkargaz Fm. Ridge between the Chiantar Glacier and the Ribat Bar, view to the NE, September, 1999.

Plate 33 - Overturned syncline in the Permian units of the Lashkargaz-Baroghil Unit. September 1999.

Plate 34 - The upper part of the Chilmarabad type-section at Chilmarabad, Yarkhun Valley; view to the west. September 1999.

Plate 35 - The Paleozoic succession along the left side of the Ribat Bar, west of the Karambar Pass. View from a lateral valley above Ribat (4500 m). September, 1999.



Plate 36 - View from a nameless peak (5100) above Vandaniil to the upper Ribat Bar toward the Karambar Pass showing the upper part of the Ribat Fm. and the lower part of the Lupsuk Fm. September 1999.



Plate 37 - View from the nameless peak of Pl. 36 across the Ribat Bar, showing the top of the Carboniferous succession overlain by the Permian Gircha Fm. September 1999.

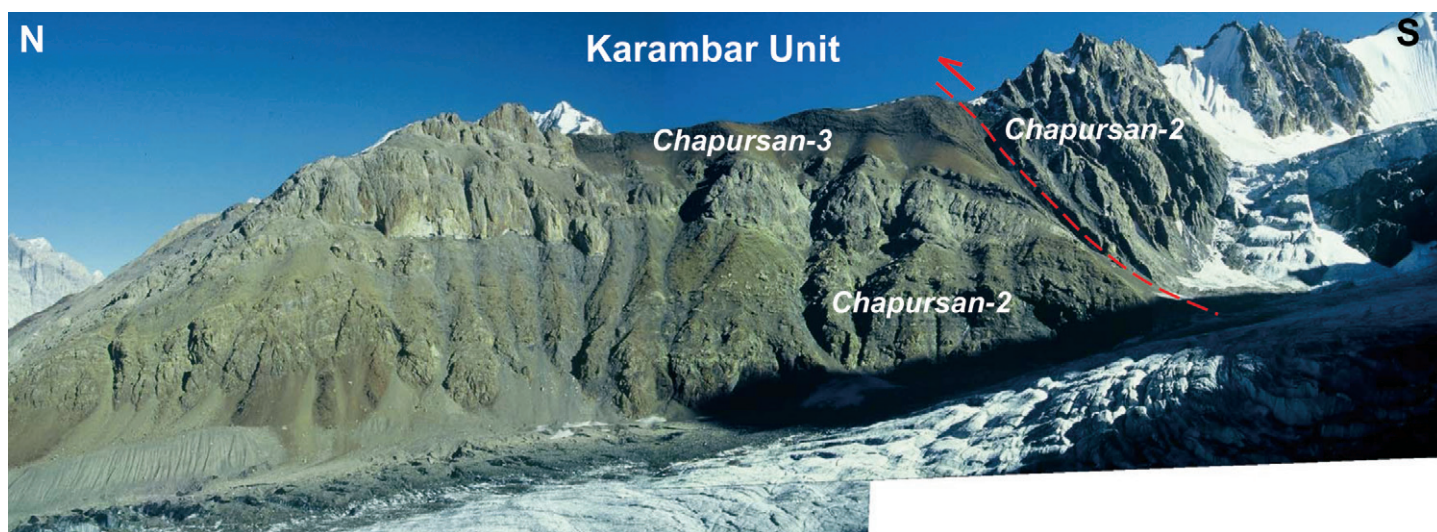


Plate 38 - Overturned footwall syncline within the Permian limestones and marls of the Chapursan Group, view to the SW from Shuinj. September 1999.

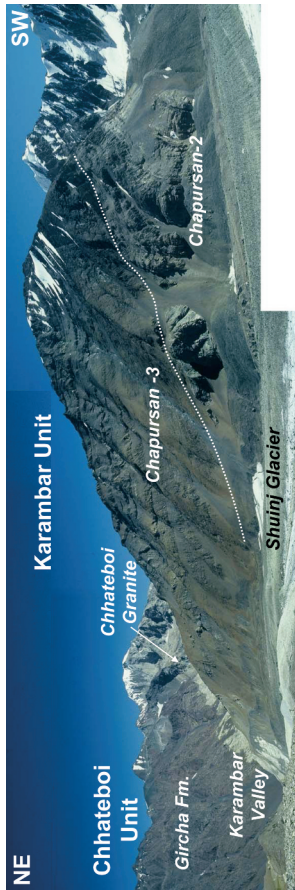


Plate 40 - The upper part of the Permian succession of Pl. 39 along the western side of the Shuinj Glacier. Fusulinid play limestones are in the foreground. September 1999.

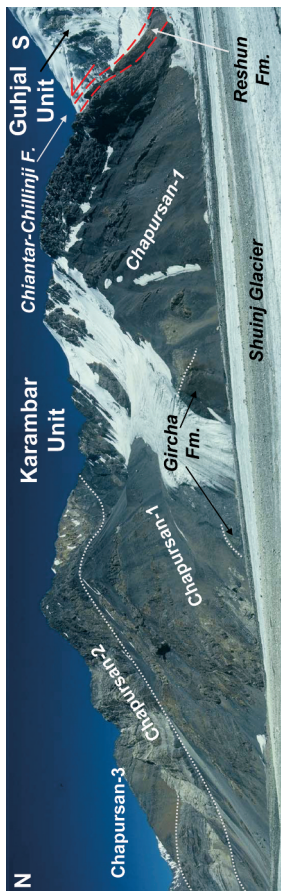


Plate 39 - Right slope of the Shuinj Glacier, showing an anticline folding the basal units of the Chapursan Group. The Gircha Fm. is exposed in the core of the structure. The Chiantar-Chillinj Fault cross-cuts the succession to the right (south). Limestones with large fusulinids outcrop along the glacier. September, 1999.

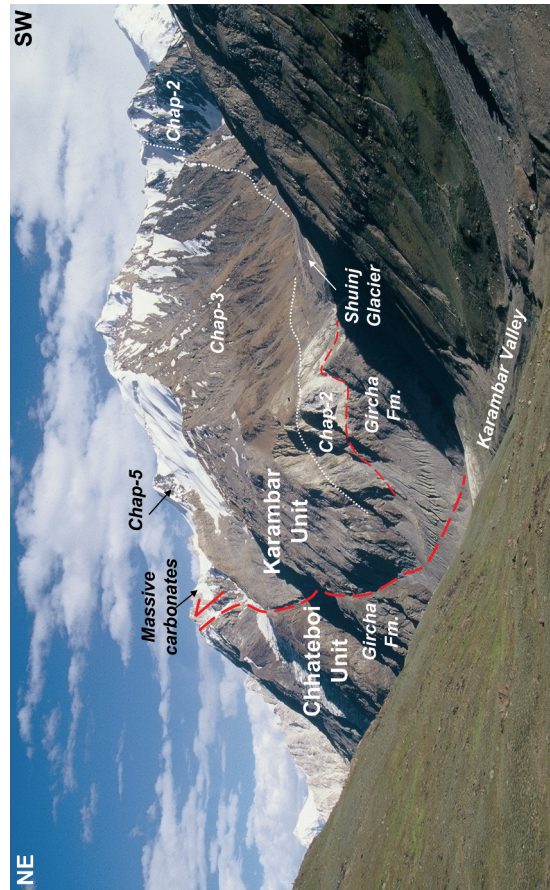


Plate 42 - View from the upper Karambar Valley to the east. The eastern boundary of the Karambar Unit is marked by a high-angle reverse fault running along the right side of the valley. Brownish rocks consist of Permian successions of the Chapursan Group. September 1996.

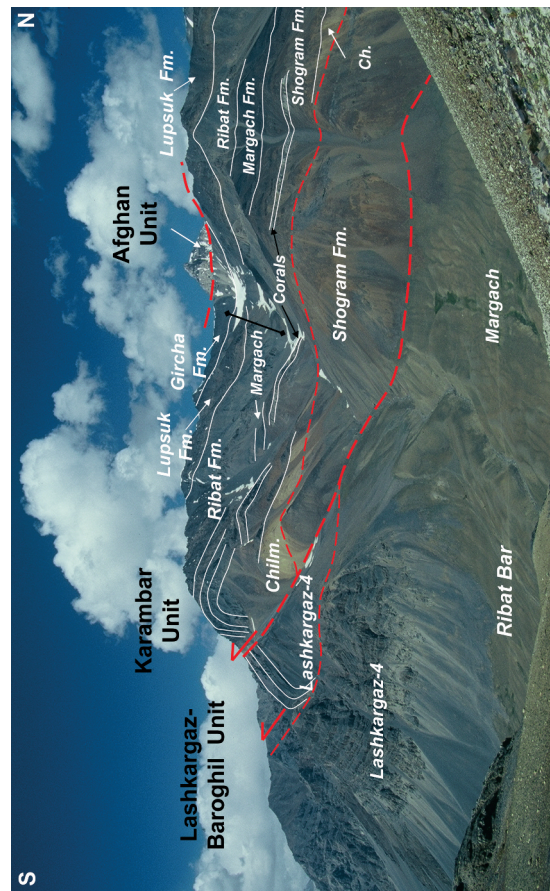


Plate 41 - Complex thrust related folds and duplexes along the main thrust surface between the Karambar and the Lashkargaz-Baroghil units above Ribat. The Devonian succession forms the basal part of the upper thrust sheet. The trace of a stratigraphic section in the Carboniferous beds is shown in black. September 1999.

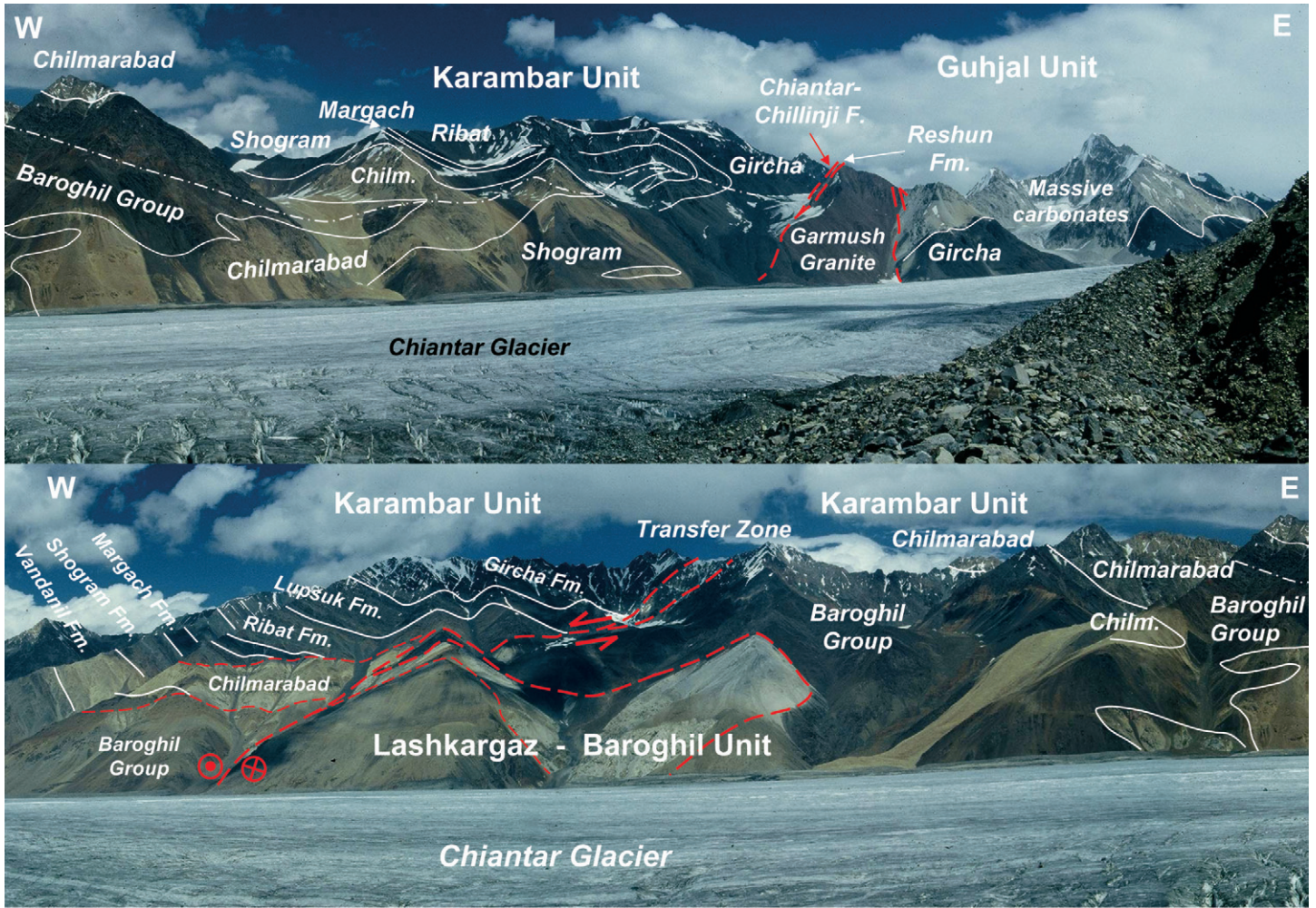


Plate 43 - Panoramic views to the NE across the Chiantar Glacier. Note the large recumbent fold affecting the Karambar Unit which overthrusts the Lashkargaz-Baroghil Unit. The Chiantar-Chillinji Fault cuts the eastern portion of the Karambar thrust sheet. A tectonic slice of the Garmush Granite separates the unit from the black and white slates and marbles of the Guhjal Unit. September 1999.

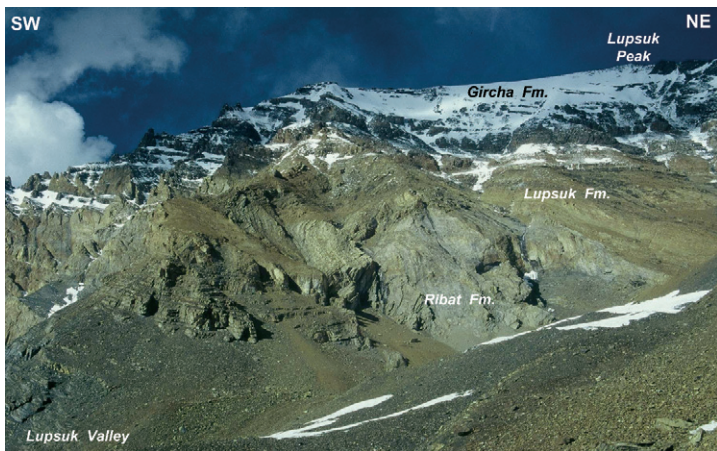


Plate 44 - SW-verging thrust and fault propagation folds (fig. 38) deforming the Carboniferous succession of the Karambar Unit developed in the Ribat Fm., below the yellowish beds of the Lupsuk Fm., looking to the top of the Lupsuk Valley. Right side of the Ribat Bar, September, 1999.



Plate 45 - The top of the Carboniferous succession in the upper Lupsuk Valley, right side of the Ribat Bar. Yellowish layers of the Lupsuk Fm. rest on grey well-bedded limestones of the Ribat Fm., interfingering with massive encrinites to the right. September 1999.

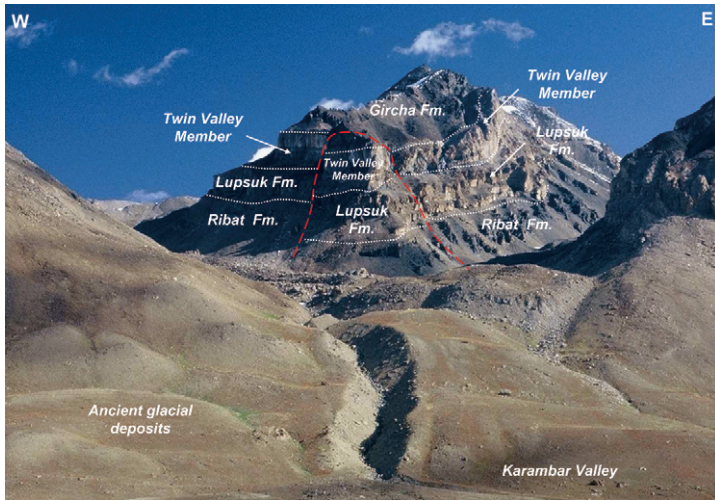


Plate 46 - The reference section of the Twin Valleys Member. Black layers on the top belong to the base of the Gircha Fm. View to the north from the uppermost part of the Karambar Valley, September, 1996.

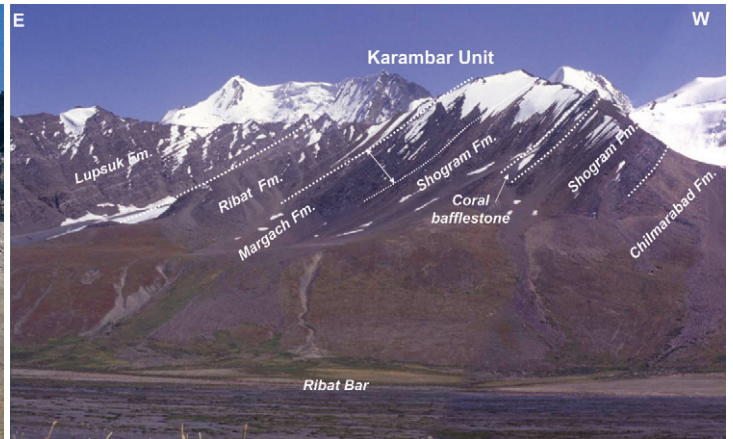


Plate 47 - The Devonian to Carboniferous succession along the left side of the Ribat Bar, containing the type-section of the Margach Fm., view to the south. September 1999.



Plate 48 - The stratigraphic contact between the Margach and the Shogram Fm. along the Afghanistan-Pakistan border. The limestone layers forming the ridge are part of the bafflestone coral layer. The Carboniferous succession is exposed to the left (south). View to the SE, September, 1999.

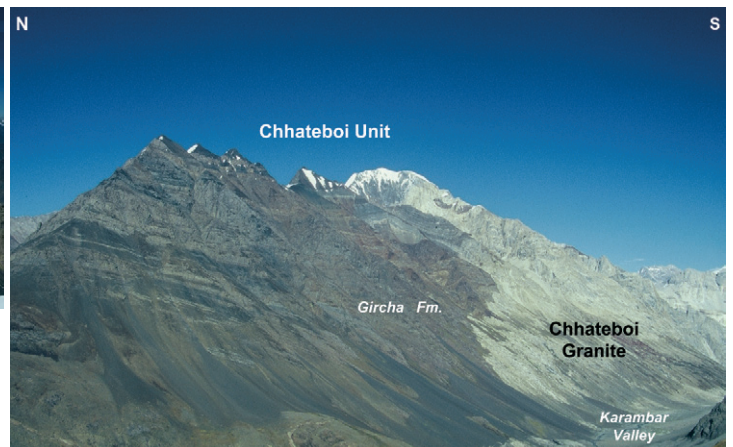


Plate 49 - The central part of the Chhateboi Unit, consisting of black slates and sandstones intruded by the Chhateboi Granite. Along the slopes of the highest peak the progressive transition from clastic to carbonatic rock can be noted. View from the Shuinj Glacier to the NE, September, 1999.

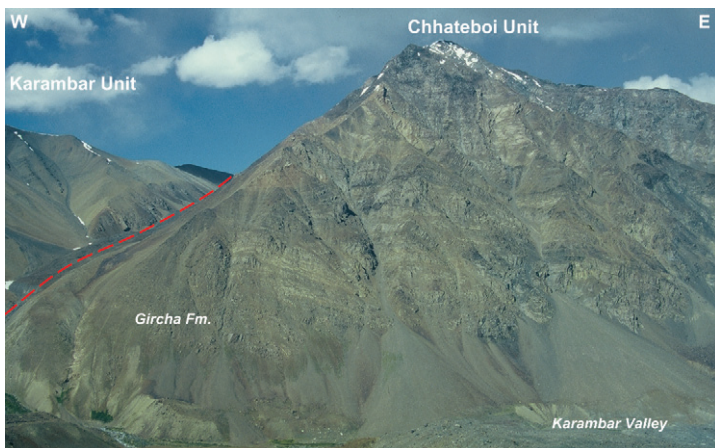


Plate 50 - The northernmost part of the Chhateboi Unit, showing overturned and recumbent folds in the thick quartzite layers interbedded in its lower part. View from the Shuinj Glacier to the N, September, 1999.



Plate 51 - General view to the south on the N-verging thrust stacking the Guhjal Unit on the Permo-Triassic succession of the Sost Unit. Red layers in the lower part of the slopes are tectonic slices of the Upper Cretaceous Tupop Fm. September, 1996.

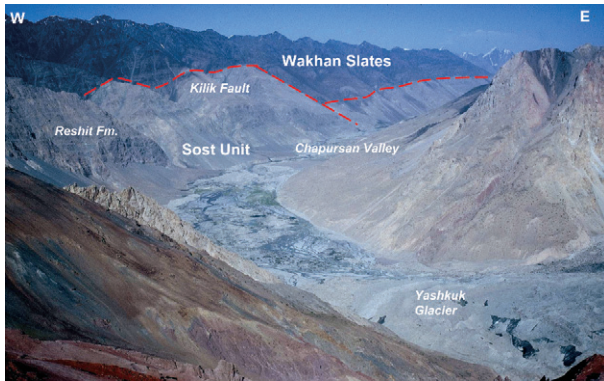


Plate 52

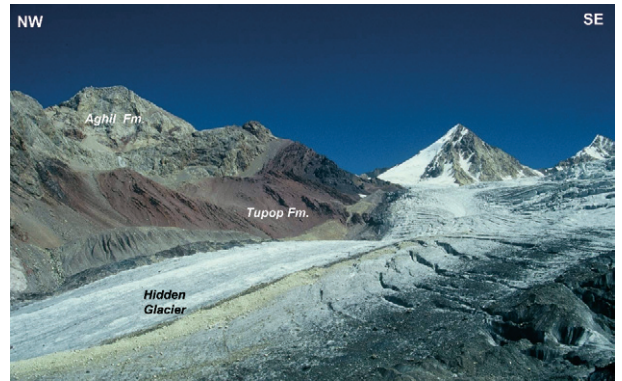


Plate 53



Plate 54

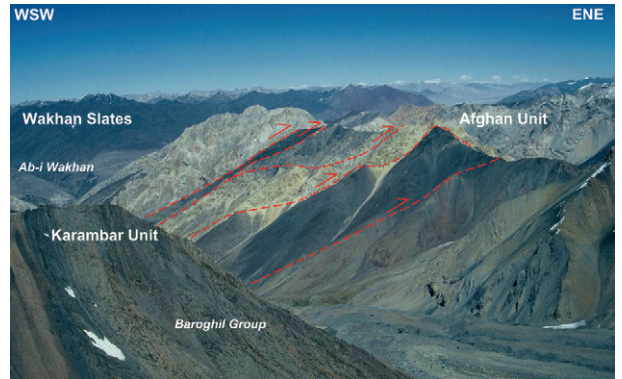


Plate 55



Plate 56

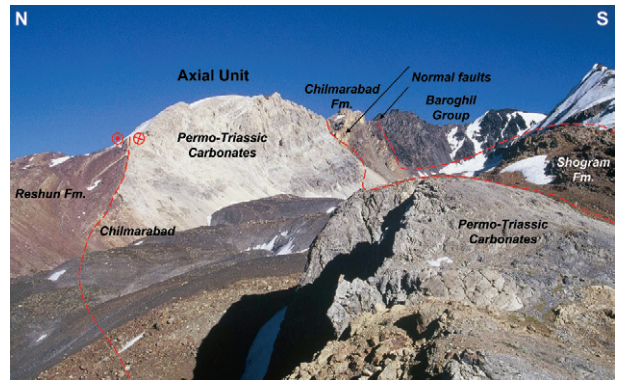


Plate 57



Plate 58



Plate 59

Plate 52 - General view of the northern slope of the Chapursan Valley from the Yashkuk Glacier area. September, 1991.

Plate 53 - A footwall syncline deforming the base of the Tupop Fm. at the top of the Hidden Valley N of Chillinji. The red beds unconformably rest on the Triassic Aghil Fm. of the Sost Unit. September, 1999.

Plate 54 - The Tupop Conglomerate in the upper Chapursan Valley along the left side of the Koz Yaz Glacier. White layers are carbonate conglomerates. September 1996.

Plate 55 - View to the Wakhan from the Afghanistan-Pakistan border above the Karambar Lake, with the mountains of SE-Pamir. Tectonic slices of white to yellowish carbonates strongly resembling respectively the Devonian to Permian units recognized in Pakistan, are embed-

ded in dark slates, Ordovician or Permian in age. The Wakhan Slates are evident in the background. September, 1999.

Plate 56 - The reduced lower Paleozoic succession of the Axial Unit at the top of the Barbin Valley with E-W trending upright folds. September, 1996.

Plate 57 - The Paleozoic of the Axial Unit below the red beds of the Reshun Fm. forming the footwall of the Reshun Fault. View to the NE, September, 1996.

Plate 58 - View across the Yarkhun Valley to the Siru Gol, showing the unconformable contact between the Reshun Fm. and the Permo-Triassic limestones of the Axial Unit. September, 1996.

Plate 59 - The stratigraphic base of the Reshun Fm. covering the Permo-Triassic carbonates of the Axial Unit above Shost. September, 1996.



Plate 60 - A big boulder consisting of coarse grained conglomerates of the Reshun Fm., at the beginning of the Siru Gol. Lucia Angiolini for scale, September, 1996.



Plate 61 - Deformed beds of the Reshun Fm. at Kan Khun along the new road to Kishmanja. Note flattened and elongated quartzite pebbles and a strong D₁ foliation. July, 2004.

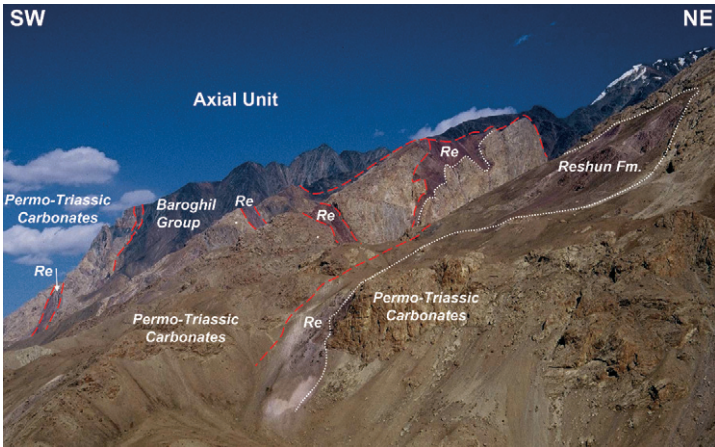


Plate 62 - Complex folds affecting the Reshun Fm. in front of Shost, left side of the Yarkhun Valley. The Baroghil Group is in the background, view to the NE. September 1996.



Plate 63 - Chillinji, details of the Carboniferous-Permian clastic beds. Fold axes in fig. 49. October, 1992.

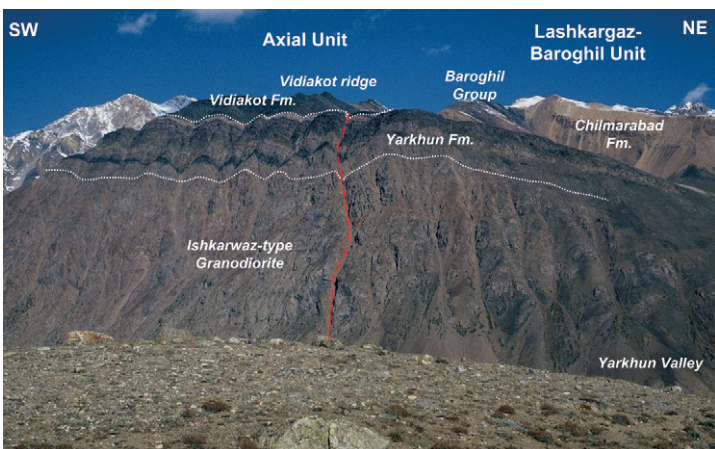


Plate 64 - The Baroghil Group, overlying the pre-Ordovician Ishkarwaz-type Granodiorite seen from Chikar. View to the north toward the Vidiakot ridge. The development of the Yarkhun Formation is well expressed along the rock wall, capped by the light microconglomerate layer. The type section was measured along the right side of the picture. Above, the lower part of the Vidiakot Formation. September, 1996.



Plate 65 - The Chikar Quartzites are extensively exposed along the left side of the Yarkhun Valley along the Shetor Glacier. View to the E-NE from a ridge above Inkup, September, 1996.



Plate 66

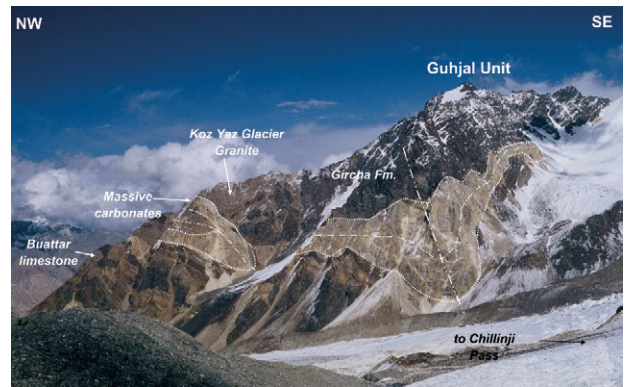


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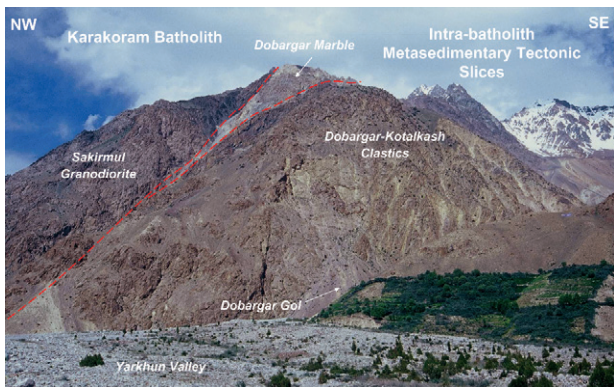


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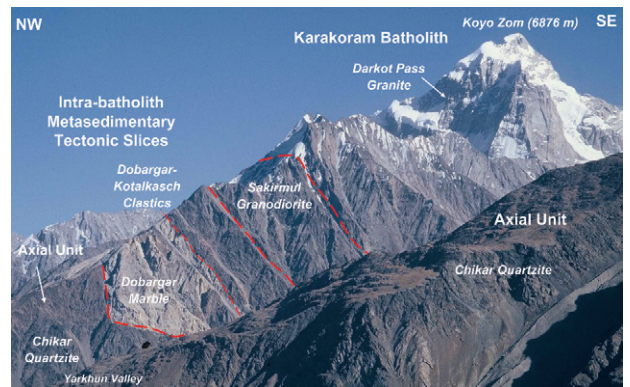


Plate 69



Plate 70

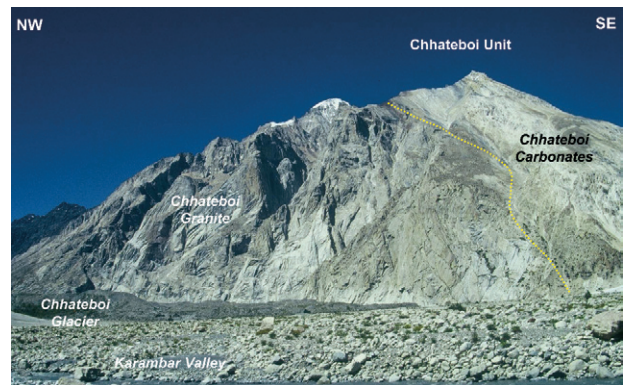


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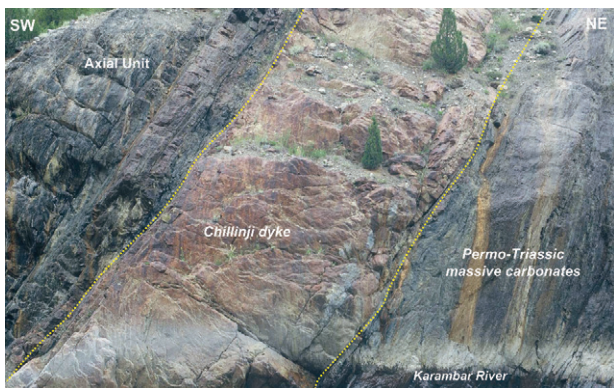


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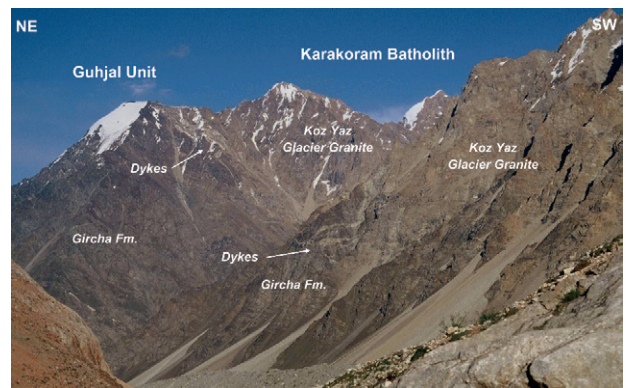


Plate 73

Plate 66 - The Chikar Quartzites along the of the Darkot Pass. September, 1996.

Plate 67 - Superposed folds above Buattar. Isoclinal folds enhanced by the massive white carbonates are folded by an open fold with a vertical axial surface. August 1996.

Plate 68 - Intra-batholith metasedimentary tectonic slices at Dobargar; view to the NE from the Yarkhun Valley. September, 1996.

Plate 69 - The Intra-batholith metasedimentary slices from Kishmanja, Yarkhun Valley. Note the Sakirmul Granodiorite and the Darkot Pass Granite with the Koyo Zom Peak. Closely folded Chikar Quartzite in

the foreground. September, 1996.

Plate 70 - The Chhateboi Granite beyond the homonymous glacier. Note the intrusive contact within the metasediments of the Chhateboi Unit. September, 1996.

Plate 71 - Intrusive relationships between the Chhateboi Granite and the Chhateboi Unit, Karambar Valley. September, 1999.

Plate 72 - A large dyke intruded into the Permo-Mesozoic limestones of the Axial Unit at Chillinji, Karambar Valley. September, 1996.

Plate 73 - The Koz Yaz Glacier Granite intruding the metasediments of the Guhjal Unit; upper Chapursan Valley. September, 1996.

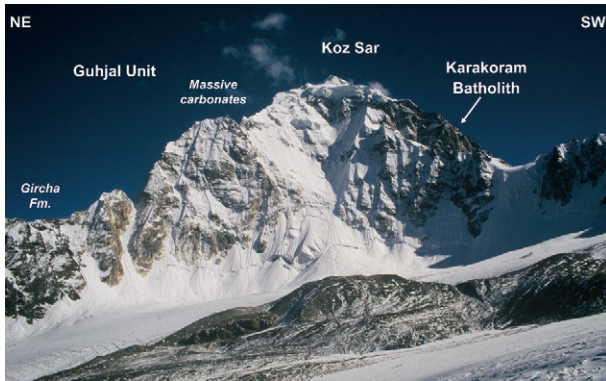


Plate 74



Plate 75

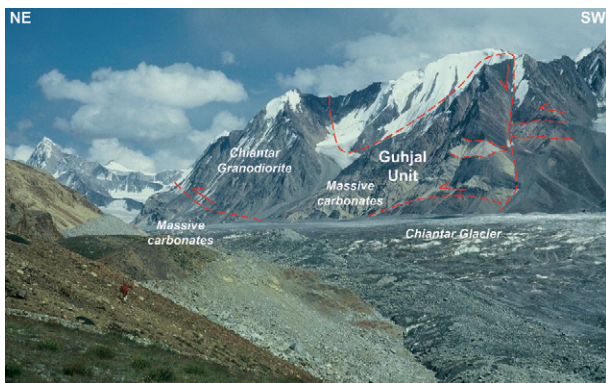


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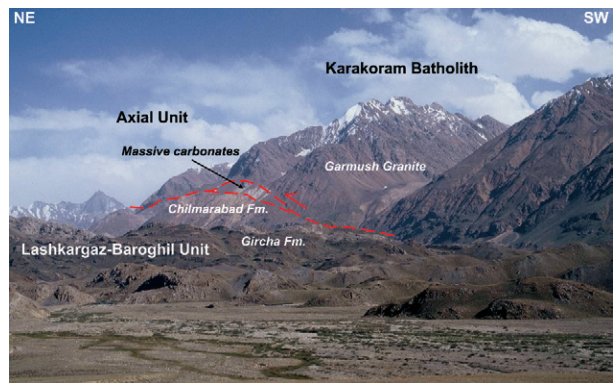


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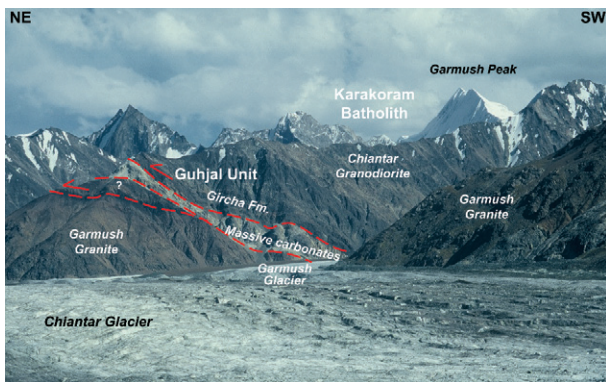


Plate 78



Plate 79

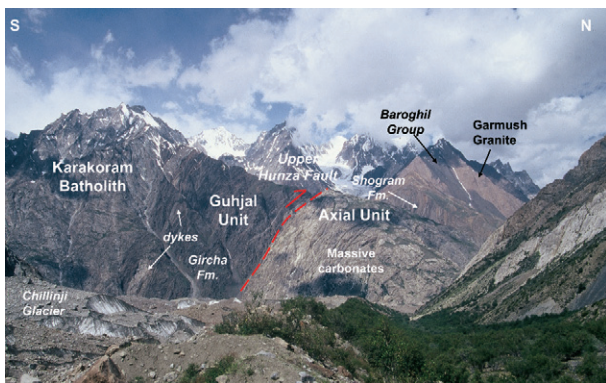


Plate 80



Plate 81

Plate 74 - Summit of the Koz Sar Peak, upper Chapursan Valley. September, 1996.

Plate 75 - General view of the Chiantar Glacier. Intrusive bodies of the Karakoram Batholith are exposed on the left side of the glacier and show tectonic contacts with Northern Karakoram. September, 1999.

Plate 76 - Close view of the Chiantar Granodiorite intruding the Guhjal Unit. Compare with Pl. 75. September, 1999.

Plate 77 - The northern boundary of the Karakoram Batholith overthrusting the Lashkargaz-Baroghil Unit upper Yarkhun Valley. September, 1996.

Plate 78 - Close view of Pl. 75, with the Garmush Granite overthrust by

the Guhjal Unit, in turn intruded by the Chiantar Granodiorite. September, 1999.

Plate 79 - The Darkot Pass Granite intruding the Darkot-Gazin Metasedimentary Belt along its southern contact, just east of the study area. View to the NE from the Thui Pass. September, 1996.

Plate 80 - Partially deformed intrusive contact between the northern side of the Karakoram Batholith (Hunza Unit) south of Chillinji, Karambar Valley. The Axial Unit is in turn intruded by the Garmush Granite. September, 1996.

Plate 81 - The carbonates of the Gum Fm. overlying black slates of the Barum Fm., Qalandar Gum Glacier. September, 1996.



Plate 82



Plate 83



Plate 84

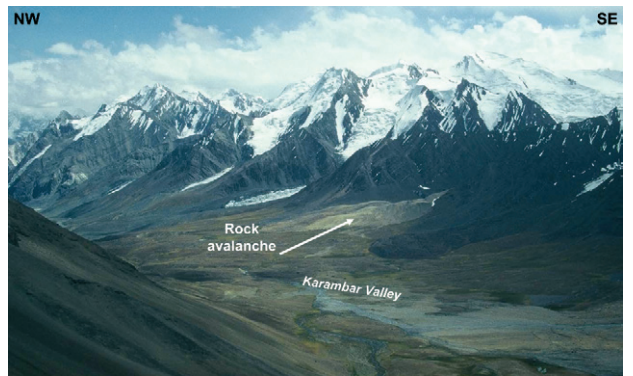


Plate 85



Plate 86



Plate 87



Plate 88

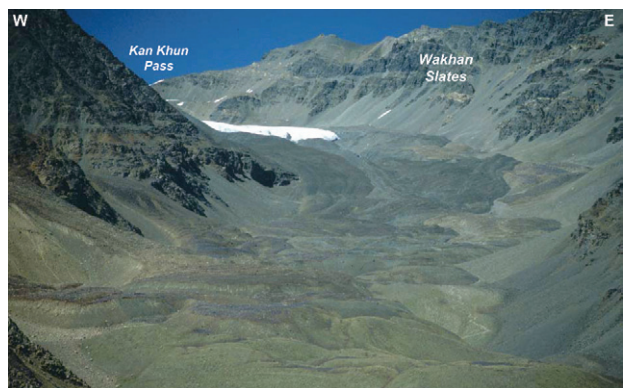


Plate 89

Plate 82 - The Chhateboi Glacier. September, 1996.
 Plate 83 - The Chiantar Glacier from a ridge above Chilmārabad; view to the E. September, 1996.
 Plate 84 - Recent alluvial valley fills along the Yarkhun riverbed between Kan Khun and Kishmanja. September, 1996.
 Plate 85 - Glacial deposits deriving from rock avalanches in yellowish dolostones of the Chilmārabad Fm., Karambar Valley. August, 1996.

Plate 86 - Frontal moraine of the Chillinji Glacier. September, 1999.
 Plate 87 - Glacial deposits along the the Ribat Bar. September, 1999.
 Plate 88 - Rock glaciers flowing along the tributary hanging valleys of the Ribat Bar, developed in the Carboniferous-Permian successions of the Karambar Unit. September, 1999.
 Plate 89 - Rock glaciers deposits in upper part of the valley towards the Kan Khun Pass. September, 1996.

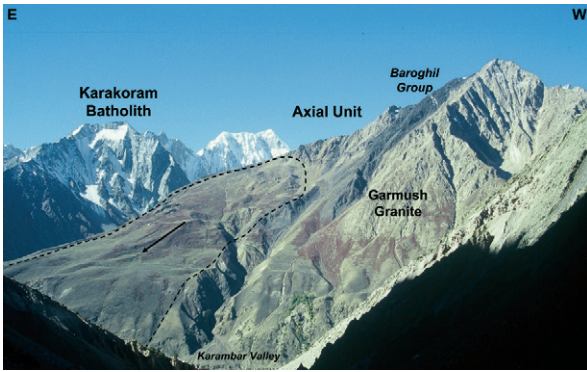


Plate 90

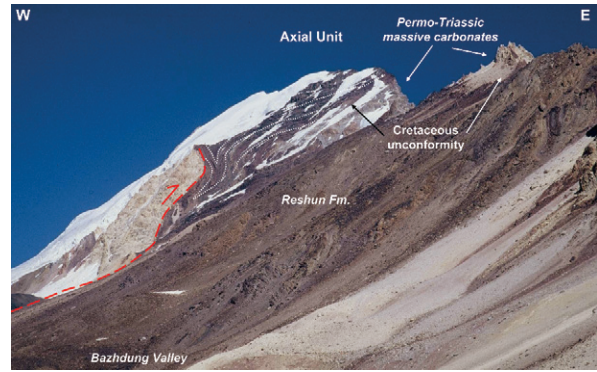


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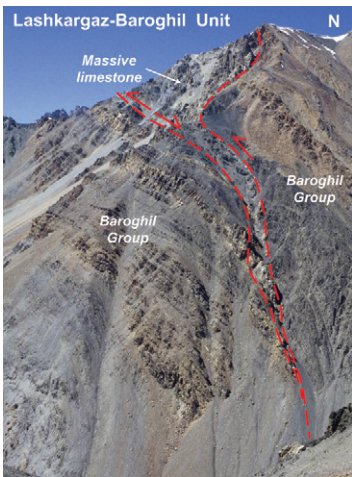


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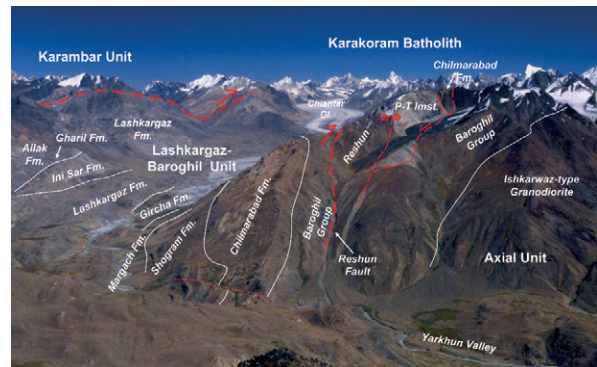


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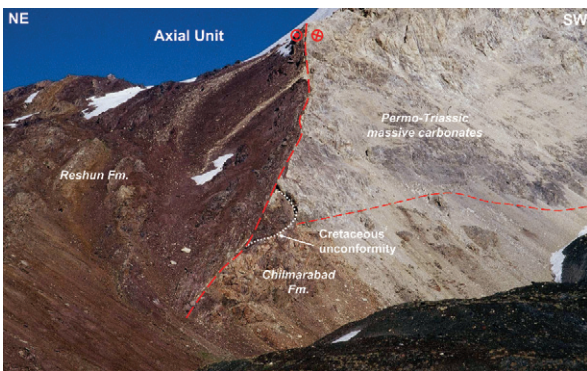


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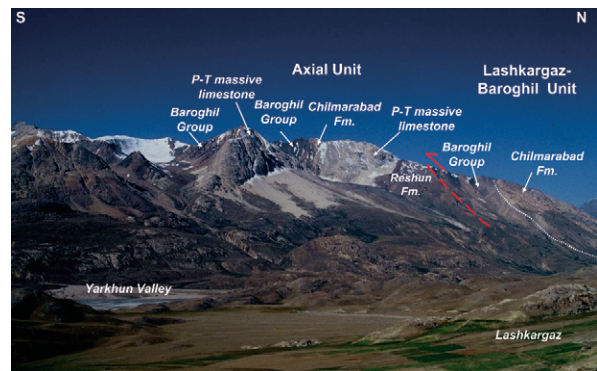


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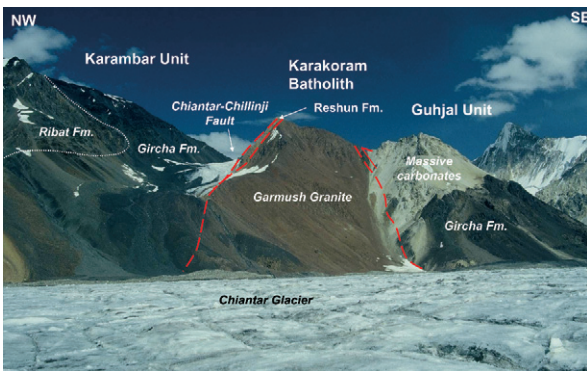


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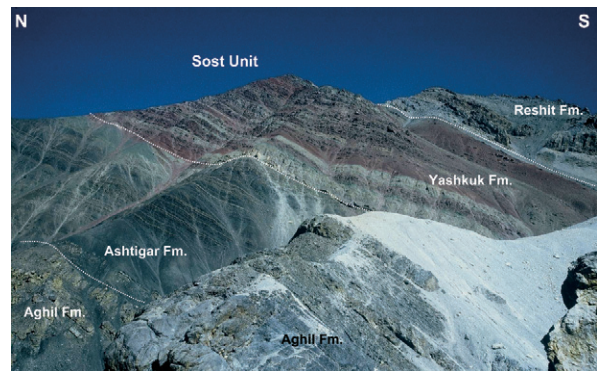


Plate 97

Plate 90 - Large translational landslide above Sorkh Rabat, Karambar Valley. The landslide initiated on the down-slope dipping Paleozoic of the Axial Unit. September, 1999.

Plate 91 - Tight folds along the Reshun Fault above Kan Khun, Yarkhun Valley; upper Bazhdung Valley. September, 1996.

Plate 92 - Important faults in the hanging wall of the Reshun F. west of the Baroghil Pass. The fault is underlined by white marble layers, possibly Permian in age. View from the Vidiakot ridge. September, 1996.

Plate 93 - The Reshun F. in front of Baroghil. Normal faults delami-

nate the Paleozoic of the Axial Unit. September, 1996.

Plate 94 - Close view of Pl. 93. Note the sharp fault separating the Reshun beds from the Permo-Mesozoic carbonates of the Axial Unit. September, 1996.

Plate 95 - The Reshun F. from Lashkargaz. September, 1996.

Plate 96 - The Chiantar-Chillinji F. along the right side of the Chiantar Glacier. Note the thin slice of Reshun Fm. along the contact with the Garmush Granite. September, 1999.

Plate 97 - The Upper Triassic to Jurassic succession in the Ashtigar Valley, Chapursan. September, 1991.