TEKNIK GEOLOGI

BUKU SAKU

GEOLOGI LAPANGAN

UNIVERSITAS MULAWARMAN

1. PERALATAN KERJA LAPANGAN

Berikan *checklist* sebelum pergi ke lapangan

- [ ] Palu geologi
- [ ] Kompas geologi
- [ ] Kaca pembesar (lup)
- [ ] Tongkat Jacob/Meteran
- [ ] Buku Catatan Lapangan
- [ ] Pensil dan Alat Tulis
- [ ] Plastik Sampel
- [ ] Spidol *marker*
- [ ] Kabel Ties / Tali Rafia
- [ ] Peta RBI
- [ ] Peta Topografi
- [ ] Peta Geologi Regional
- [ ] GPS
- [ ] Komparator Butir
- [ ] HCl
- [ ] Jas Hujan

**silakan tambahkan sendiri untuk melengkapi*

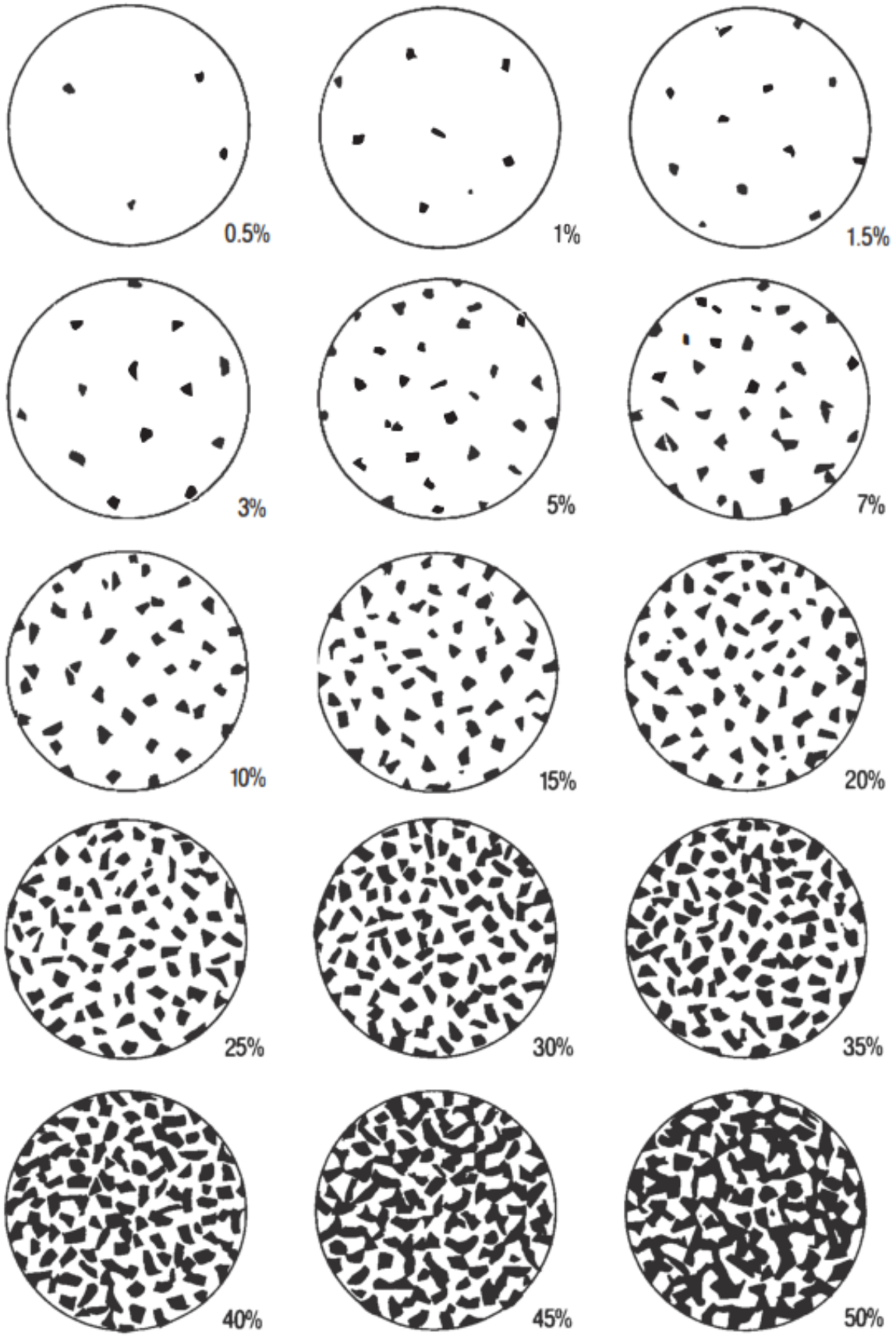
2. SINGKATAN TERMINOLOGI

Geological Abbreviations

abundant	abnt	clinopyroxene	Cpx
acicular	acic	cobble	Cbl
actinolite	Act	conglomerate	Cgl
aggregate	Aggr	contact	Ctc
albite	Ab	cordierite	Cord
amorphous	amor	corundum	Cor
amount	Amt	cross-bedded	xbdd
amphibole	Amph	cross-bedding	Xbdg
amphibolite	Ampht	cross-laminated	xlam
andalusite	Andal	cross section	X sect
angle	∠	crystal	Xl
angular	ang	crystalline	xln
andesite	And	diameter	Diam
anhedral	anhed	different	diff
anhydrite	Anhy	diopside	Diop
approximate	approx	disseminated	dissem
arenaceous	aren	dolomite	Dol
argillaceous	arg	dolomitic	dol
argillite	Arg	elevation	Elev
arkosic	ark	equivalent	equiv
arsenopyrite	Ars	evaporite	Evap
asphaltic	asph	exposure	Exp
average	Ave	feldspathic	feld
bedded	bdd	foliated	fol
bedding	Bdng	foliation	Fol
bentonite	Bent	foraminifer	Foram
biotite	Bio	formation	Fm
bituminous	bit	fragmental	frag
boulder	Bldr	glauconite	Glauct
brachiopod	Brach	granite	Gr
breccia	Bx	granodiorite	Grd
calcareous	calc	granular	gran
carbonaceous	carb	graptolite	Grap
cavernous	cav	graywacke	Gwke
cement	Cmt	greenstone	Grnst
chalcedony	Chal	gypsiferous	gyp
chalcopyrite	Cp	hematitic	hem
chlorite	Chl	horizontal	horiz
claystone	Clst	hornblende	Hbl
cleavage	Clv	hornfels	Hfls

3. DIAGRAM PRESENTASI

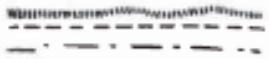
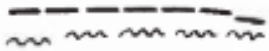
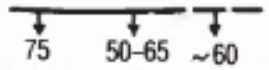
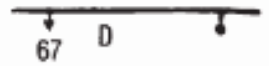
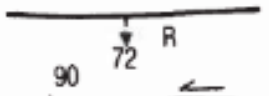
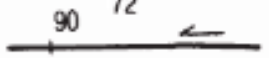
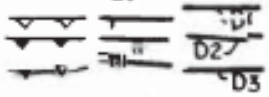
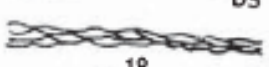
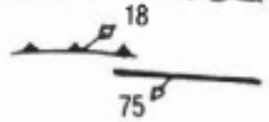
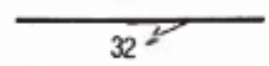
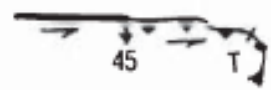
untuk estimasi komposisi berdasarkan volume



Sumber : Compton (1985)

4. SIMBOLISASI PETA GEOLOGI

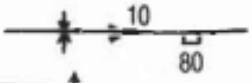
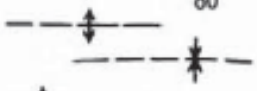
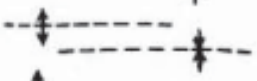
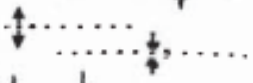
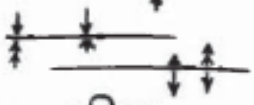
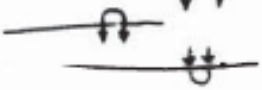
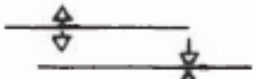
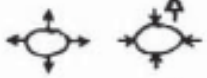
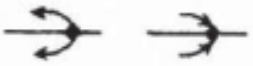
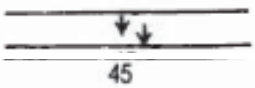
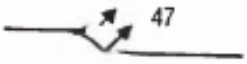
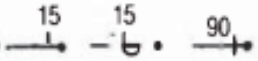
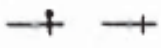
dan keterangan penggunaannya

1		Contact, showing dip where trace is horizontal, and strike and dip where trace is inclined
2		Contact, located approximately (give limits)
3		Contact, located very approximately, or conjectural
4		Contact, concealed beneath mapped units
5		Contact, gradational (optional symbols)
6		Fault, nonspecific, well located (optional symbols)
7		Fault, nonspecific, located approximately
8		Fault, nonspecific, assumed (existence uncertain)
9		Fault, concealed beneath mapped units
10		Fault, high-angle, showing dip (left) and approximate dips
11		Fault, low-angle, showing approximate dip and strike and dip
12		Fault, high-angle normal (D or ball and bar on downthrown side)
13		Fault, reverse (R on upthrown side)
14		Fault, high-angle strike-slip (example is left lateral)
15		Fault, thrust (T on overthrust side)
16		Fault, low-angle normal or detachment (D on downthrown side)
17		Fault, low-angle strike-slip (example is right lateral)
18		Fault, low-angle, overturned (teeth in direction of dip)
19		Optional sets of symbols for different age-groups of faults
20		Fault zone or shear zone, width to scale (dip and other accessory symbols may be added)
21		Faults with arrows showing plunge of rolls, grooves or slickensides
22		Fault showing bearing and plunge of net slip
23		Point of inflection (bar) on a high-angle fault
24		Points of inflection on a strike-slip fault passing into a thrust

Sumber Gambar : Compton (1985)

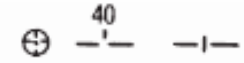
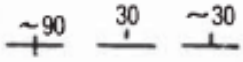
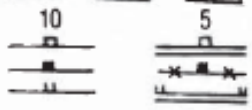
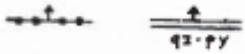
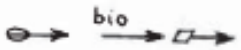
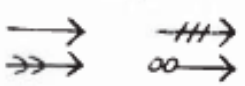
4. SIMBOLISASI PETA GEOLOGI

dan keterangan penggunaannya

25		Fault intruded by a dike
26		Faults associated with veins
27		Anticline, showing trace and plunge of hinge or crest line (specify)
28		Syncline (as above), showing dip of axial surface or trough surface
29		Folds (as above), located approximately
30		Folds, conjectural
31		Folds beneath mapped units
32		Asymmetric folds with steeper limbs dipping north (optional symbols)
33		Anticline (top) and syncline, overturned
34		Antiformal (inverted) syncline
35		Synformal (inverted) anticline
36		Antiform (top) and synform (stratigraphic sequence unknown)
37		Separate dome (left) and basin
38		Culmination (left) and depression
39		Small anticline and syncline, showing shapes in horizontal section
40		Vertically plunging anticline and syncline
41		Monocline, south-facing, showing traces of axial surfaces
42		Steeply plunging monocline or flexure, showing trace in horizontal section and plunge of hinges
43		Plunge of hinge lines of small folds, showing shapes in horizontal section
44		Strike and dip of beds or bedding
45		Strike and dip of overturned beds
46		Strike and dip of beds where stratigraphic tops are known from primary features
47		Strike and dip of vertical beds or bedding (dot is on side known to be stratigraphically the top)
48		Horizontal beds or bedding (as above)

4. SIMBOLISASI PETA GEOLOGI

dan keterangan penggunaannya

49		Approximate (typically estimated) strike and dip of beds
50		Strike of beds exact but dip approximate
51		Trace of single bed, showing dip where trace is horizontal and where it is inclined
52		Strike and dip of foliation (optional symbols)
53		Strike of vertical foliation
54		Horizontal foliation
55		Strike and dip of bedding and parallel foliation
56		Strike and dip of joints (left) and dikes (optional symbols)
57		Vertical joints (left) and dikes
58		Horizontal joints (left) and dikes
59		Strike and dip of veins (optional symbols)
60		Vertical veins
61		Horizontal veins
62		Bearing (trend) and plunge of lineation
63		Vertical and horizontal lineations
64		Bearing and plunge of cleavage-bedding intersection
65		Bearing and plunge of cleavage-cleavage intersections
66		Bearings of pebble, mineral, etc. lineations
67		Bearing of lineations in plane of foliation
68		Horizontal lineation in plane of foliation
69		Vertical lineation in plane of vertical foliation
70		Bearing of current from primary features; from upper left: general; from cross-bedding; from flute casts; from imbrication

Sumber Gambar : Compton (1985)

4. SIMBOLISASI PETA GEOLOGI

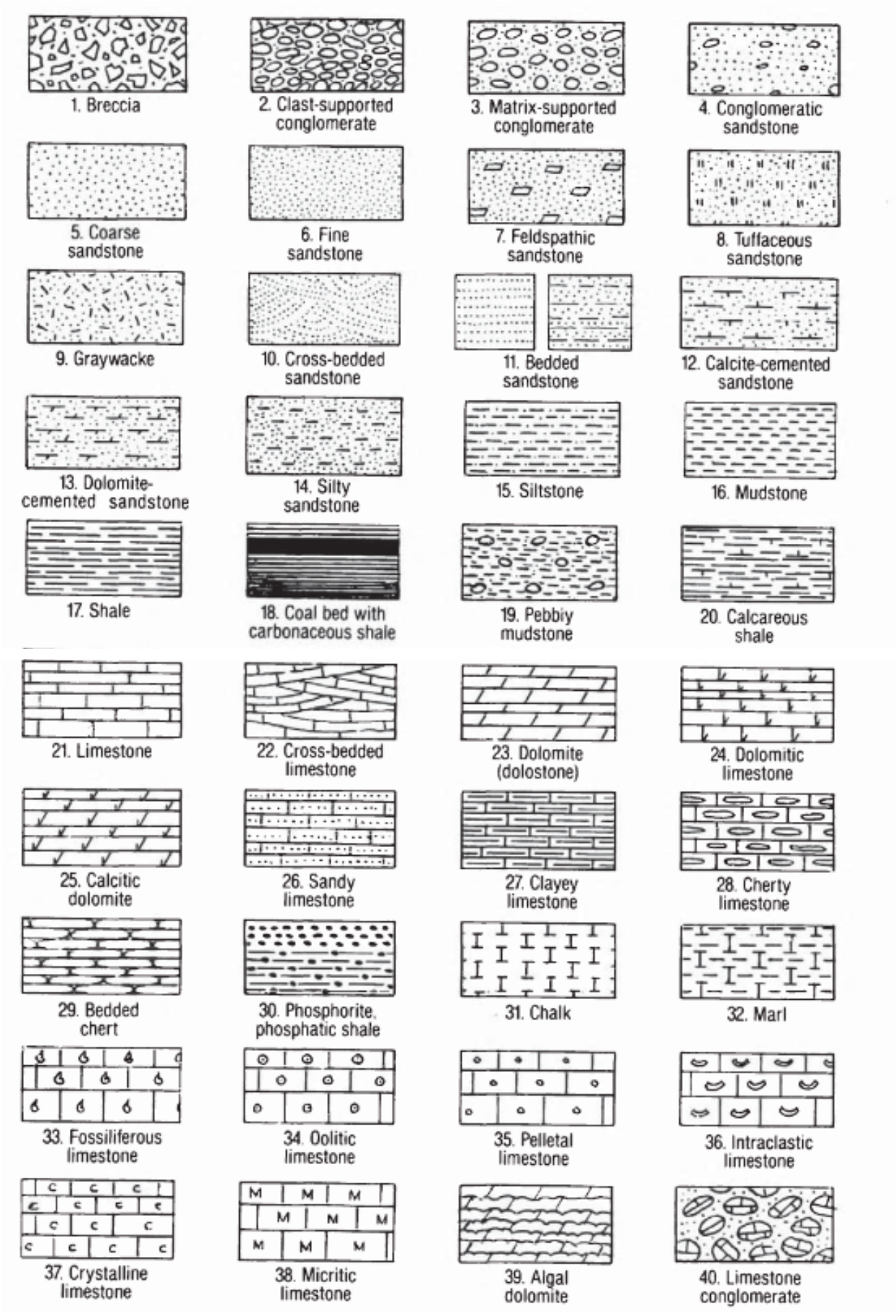
dan keterangan penggunaannya

71		Bearing of wind direction from dune forms (left) and cross-bedding
72		Bearing of ice flow from striations (left) and orientation of striations
73		Bearing of ice flow from drumlins
74		Bearing of ice flow from crag and tail forms
75		Spring
76		Thermal spring
77		Mineral spring
78		Asphaltic deposit
79	BIT	Bituminous deposit
80		Sand, gravel, clay, or placer pit
81		Mine, quarry, or open pit
82		Shafts: vertical, inclined, and abandoned
83		Adit, open (left) and inaccessible
84		Trench (left) and prospect
85		Water wells: flowing, nonflowing, and dry
86		Oil well (left) and gas well
87		Well drilled for oil or gas, dry
88		Wells with shows of oil (left) and gas
89		Oil or gas well, abandoned (left) and shut in
90		Drilling well or well location
91		Glory hole, open pit, or quarry, to scale
92		Dump or fill, to scale

Sumber Gambar : Compton (1985)

5. LITHOLOGIC PATTERN

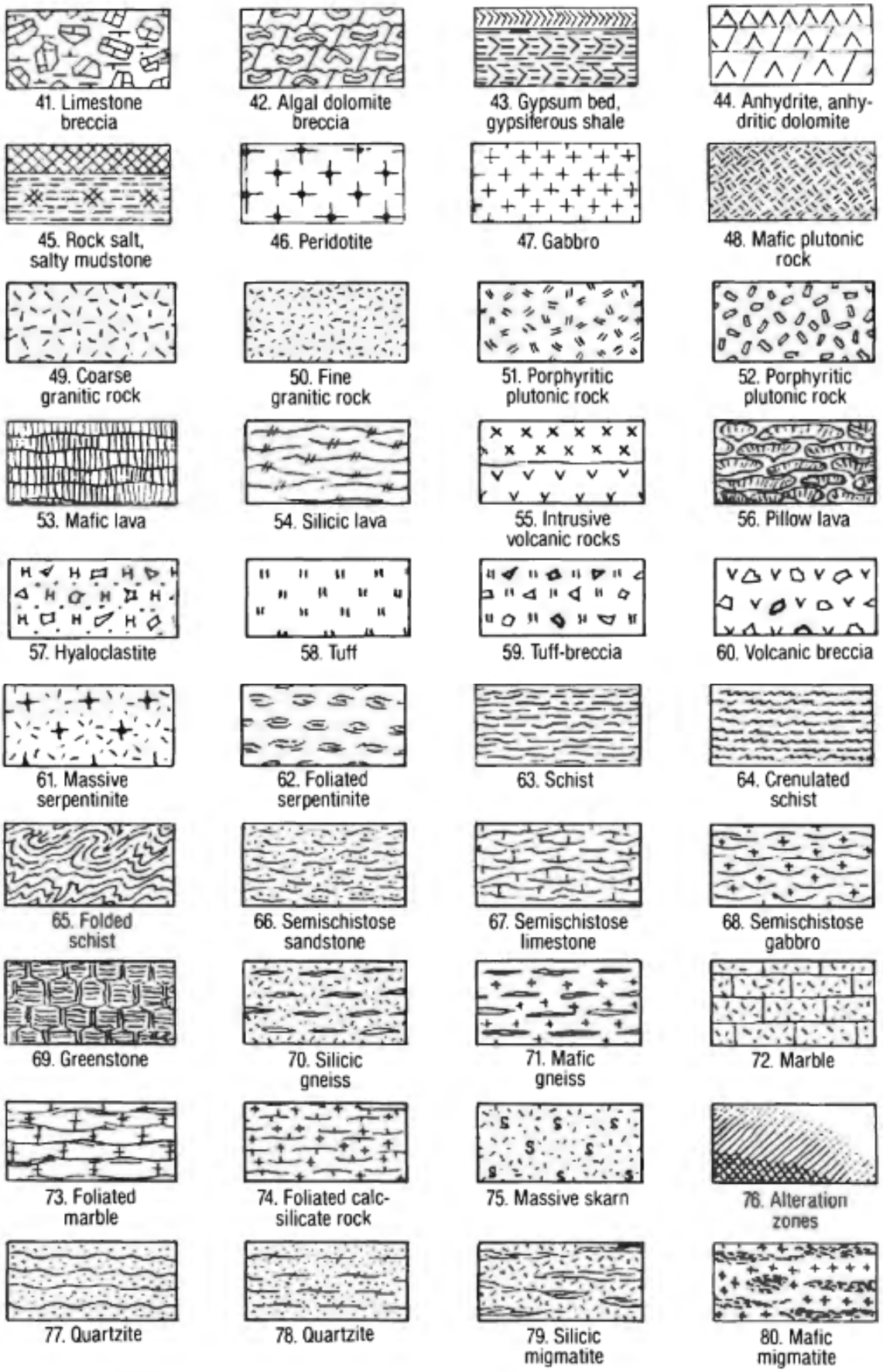
untuk pembuatan kolom stratigrafi dan penampang melintang



Sumber Gambar : Compton (1985)

5. LITHOLOGIC PATTERN

untuk pembuatan kolom stratigrafi dan penampang melintang



Sumber Gambar : Compton (1985)

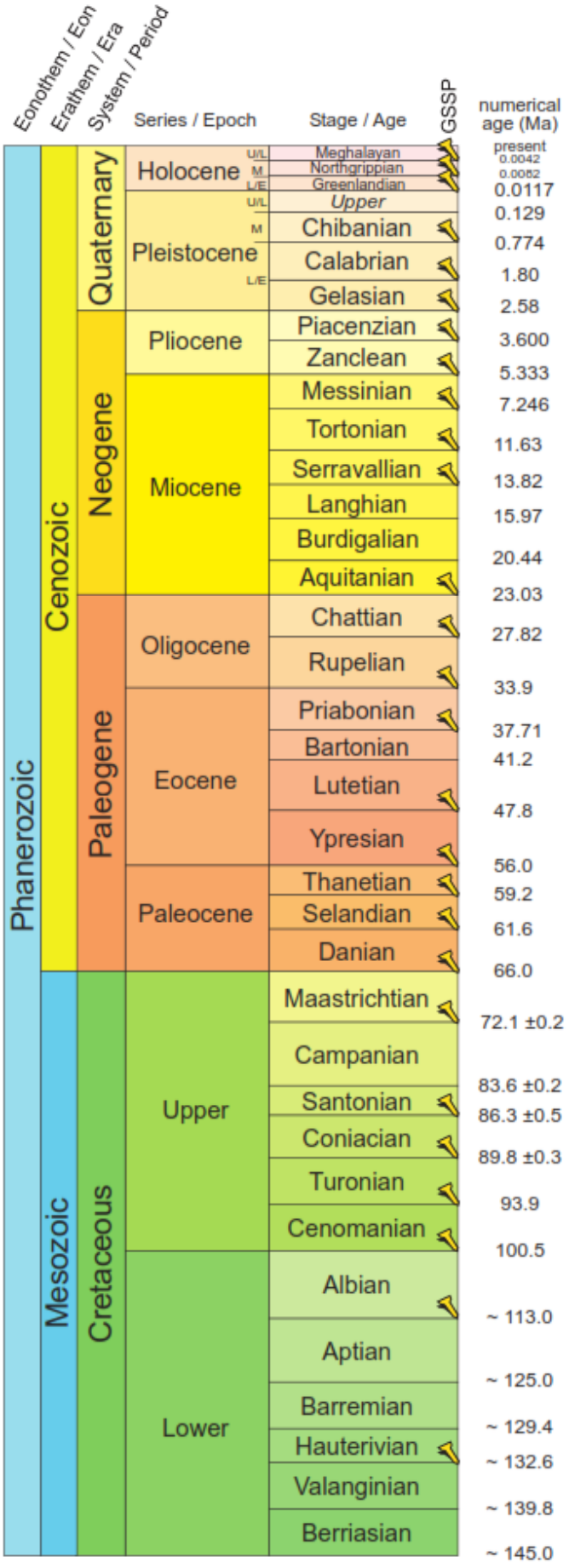
6. SIMBOL FOSIL DAN STRUKTUR

untuk pembuatan kolom stratigrafi dan catatan lapangan

	Algae
	Algal mats
	Ammonites
	Belemnites
	Brachiopods
	Bryozoans
	Corals, solitary
	Corals, colonial
	Crinoids
	Echinoderms
	Echinoids
	Fish bones
	Fish scales
	Foraminifers, general
	Foraminifers, large
	Fossils
	Fossils abundant
	Fossils sparse
	Gastropods
	Graptolites
	Leaves
	Ostracodes
	Pelecypods
	Root molds
	Spicules
	Stromatolites
	Tree trunk in place
	Tree trunk fallen
	Trilobites
	Vertebrates
	Wood
	Beds distinct
	Beds obscure
	Unbedded
	Graded beds
	Planar cross-bedding
	Trough cross-bedding
	Ripple structures
	Cut and fill
	Load casts
	Scour casts
	Convolution
	Slumped beds
	Paleosol
	Mud cracks
	Salt molds
	Burrows
	Pellets
	Oolites
	Pisolites
	Intraclasts
	Stylolite
	Concretion
	Calcitic concretion

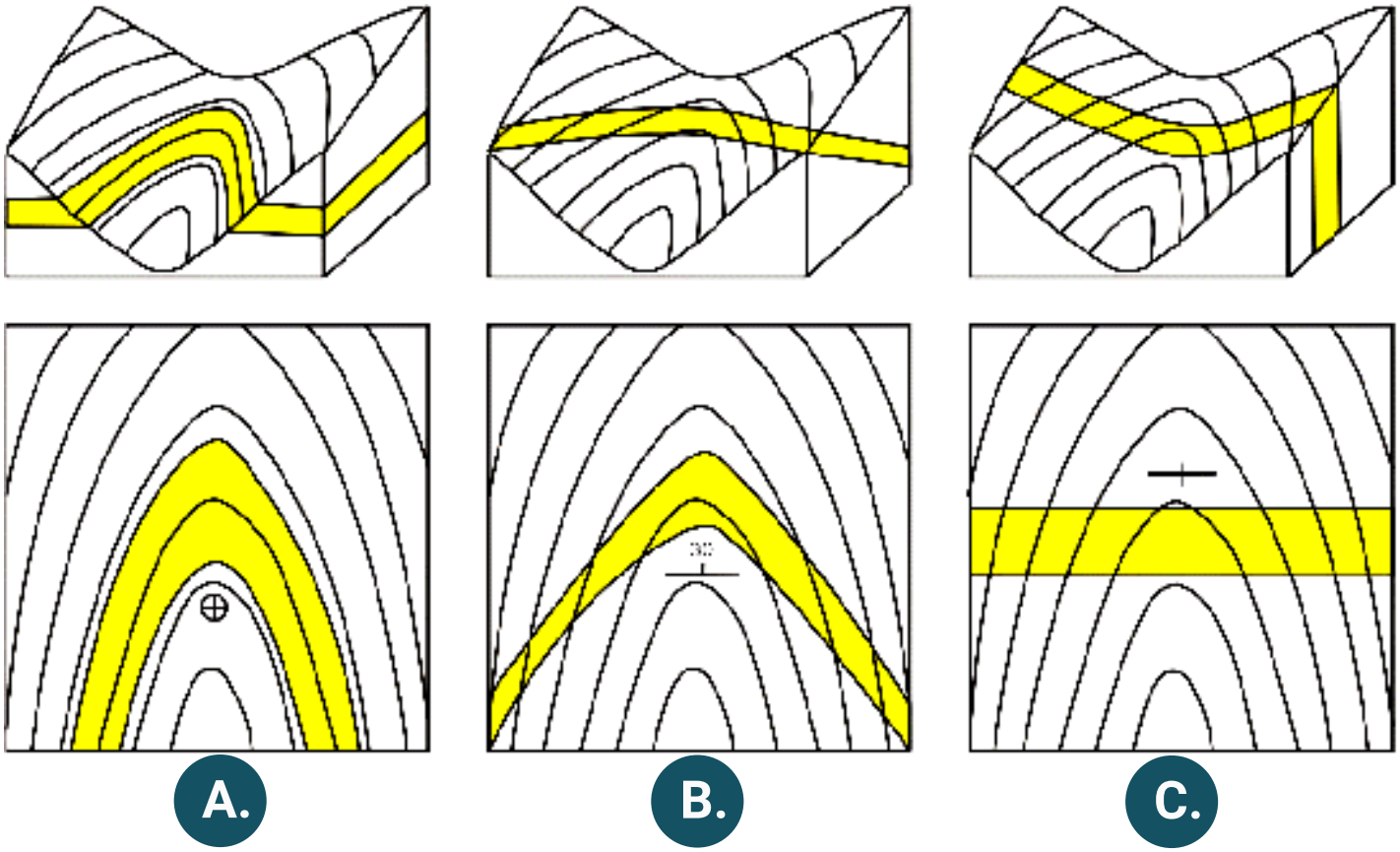
7. SKALA WAKTU GEOLOGI

PHANEROZOIC CHRONOSTRATIGRAPHIC CHART

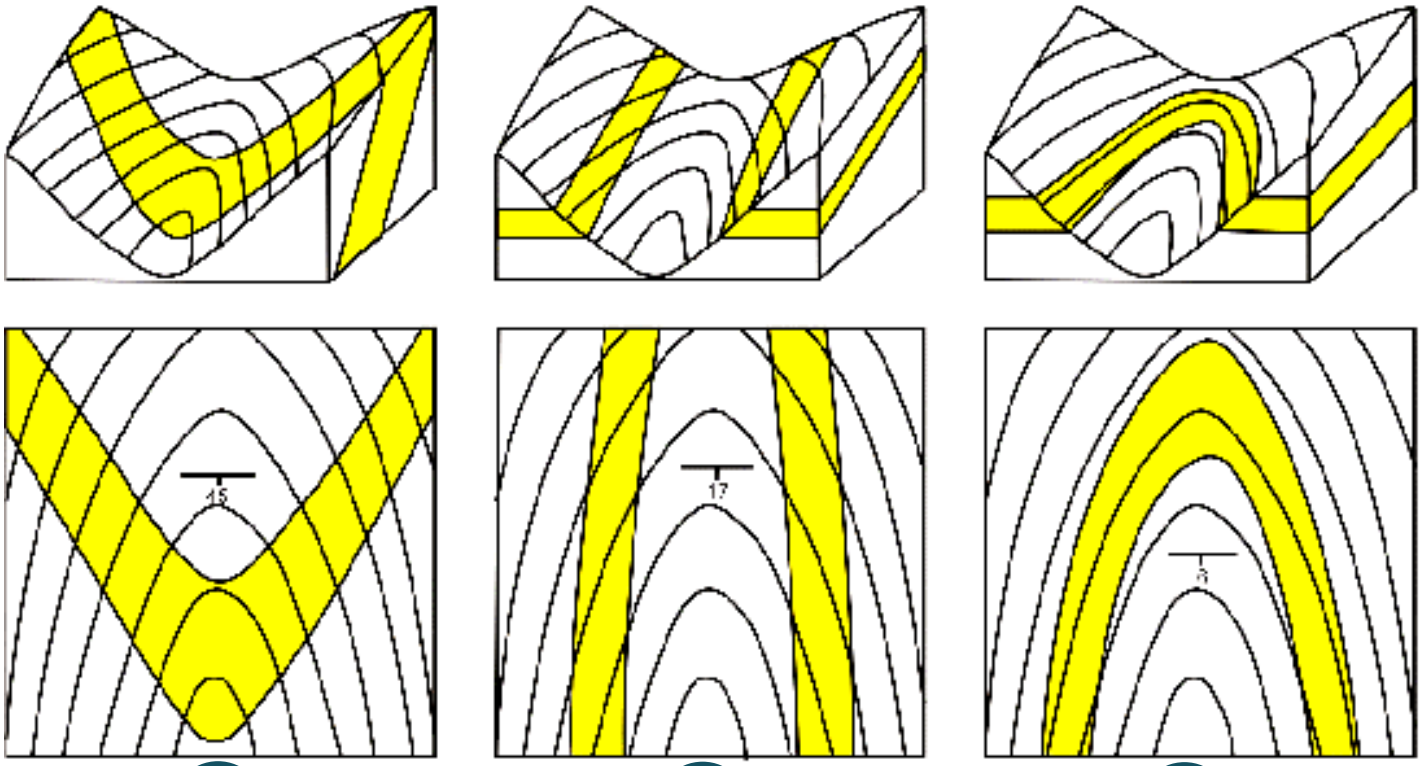


8. KAIDAH HUKUM V

Konsep Dasar



A. B. C.



D. E. F.

8. KAIDAH HUKUM V

Konsep Dasar

Hukum V adalah hukum yang menjelaskan mengenai hubungan kedudukan perlapisan batuan dengan bentuk topografi berelief. Hal ini akan berpengaruh saat geologis bermaksud mendelineasi *cropline/*pola pelamparan singkapan pada peta geologi. Terdapat beberapa aturan-aturan dalam hukum V yaitu sebagai berikut :

A. Perlapisan batuan yang memiliki **dip 0˚/horizontal** akan berpengaruh pada penarikan pola singkapan yang mengikuti pola garis kontur.

B. Perlapisan batuan yang memiliki kemiringan yang **berlawanan** dengan arah kemiringan lereng maka kenampakan lapisan akan memotong lembah dengan pola singkapan membentuk huruf "V" yang berlawanan dengan arah kemiringan lembah. Pastikan besarnya sudut mengikuti dip yang terukur

C. Pada perlapisan batuan yang memiliki d**ip 90˚/tegak** akan membentuk pola singkapan berupa garis lurus dimana pola singkapan ini tidak dipengaruhi oleh keadaan topografi.

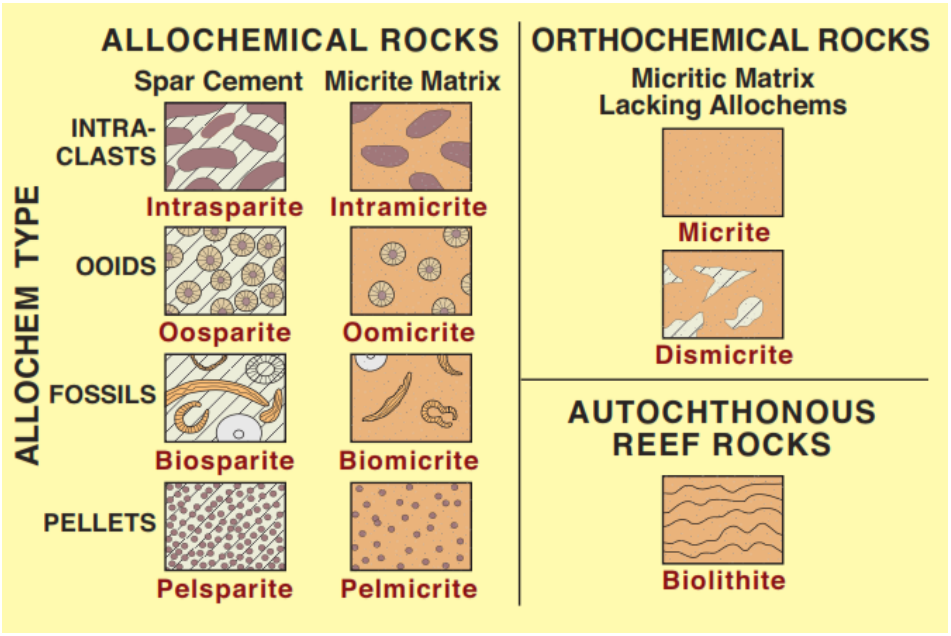
D. Pada perlapisan batuan yang miring **searah** dengan arah kemiringan lereng yang memiliki kemiringan lapisan lebih besar daripada kemiringan lereng akan membentuk pola singkapan dengan huruf "V" mengarah sama (searah) dengan arah kemiringan lereng.

E. Perlapisan batuan yang memiliki kemiringan yang **searah** dengan kemiringan lereng dimana besar kemiringan lapisan **lebih kecil** dari kemiringan lereng , maka pola singkapannya akan membentuk huruf "V" yang berlawanan dengan arah kemiringan topografi/lembah.

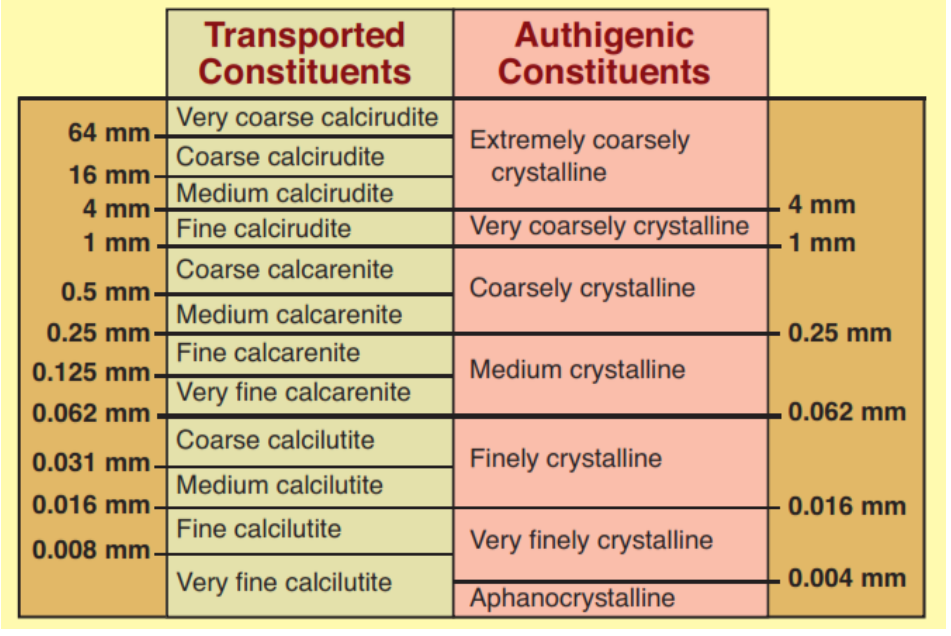
F. Lapisan yang memiliki kemiringan **searah** dengan kemiringan lembah/topografi dan besarnya kemiringan lapisan **hampir sama** dengan kemiringan lereng/lembah maka pola singkapan tampak memotong kontur dengan arah yang cukup landai.

9. KLASIFIKASI BATUAN KARBONAT

Folk (1962)



Percent allochems	> 2/3 LIME MUD MATRIX				SUBEQUAL SPAR and LIME MUD	> 2/3 LIME SPAR CEMENT		
	0-1%	1-10%	10-50%	> 50%		SORTING POOR	SORTING GOOD	ROUNDED and ABRADED
Textural name	MICRITE and DIS-MICRITE	FOSSILI-FEROUS MICRITE	SPARSE BIO-MICRITE	PACKED BIO-MICRITE	POORLY-WASHED BIO-SPARITE	UN-SORTED BIO-SPARITE	SORTED BIO-SPARITE	ROUNDED BIO-SPARITE
Typical fabric								
Terri-genous analogs	Claystone		Sandy clay-stone	Clayey or immature sandstone		Sub-mature sand-stone	Mature sand-stone	Super-mature sand-stone



Sumber Gambar : Scholle & Scholle (2003)

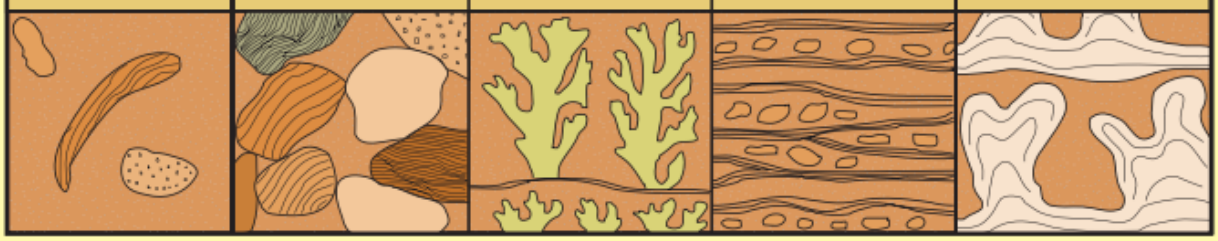
9. KLASIFIKASI BATUAN KARBONAT

Dunham (1962)

DEPOSITIONAL TEXTURE RECOGNIZABLE				DEPOSITIONAL TEXTURE NOT RECOGNIZABLE
Original Components Not Bound Together During Deposition			Original Components Bound Together During Deposition	
Contains mud		Lacks mud and is grain-supported		
Mud-supported	Grain-supported			
< 10% grains	> 10% grains			
Mud-stone	Wacke-stone	Packstone	Grain-stone	Boundstone	Crystalline carbonate (Subdivisions based on texture or diagenesis)

Embry & Klovan (1962)

Original Components Not Organically Bound During Deposition		Original Components Organically Bound During Deposition		
> 10% grains >2 mm		Organisms acted as baffles	Organisms encrusted and bound	Organisms built a rigid framework
Matrix-supported	Supported by components larger than 2 mm			
Floatstone	Rudstone	Bafflestone	Bindstone	Framestone

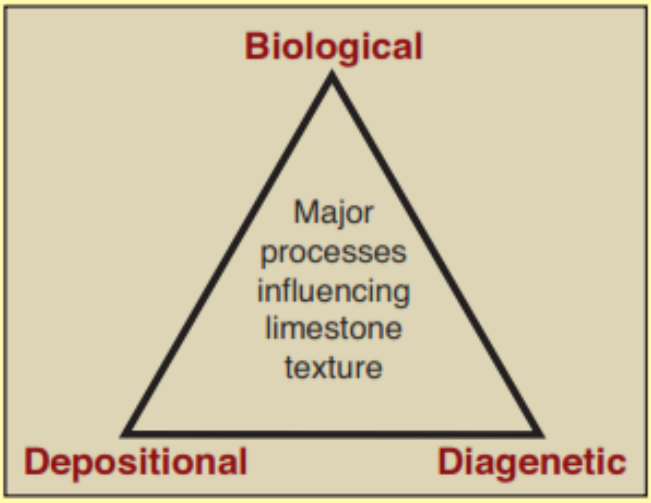


Sumber Gambar : Scholle & Scholle (2003)

9. KLASIFIKASI BATUAN

Wright (1992)

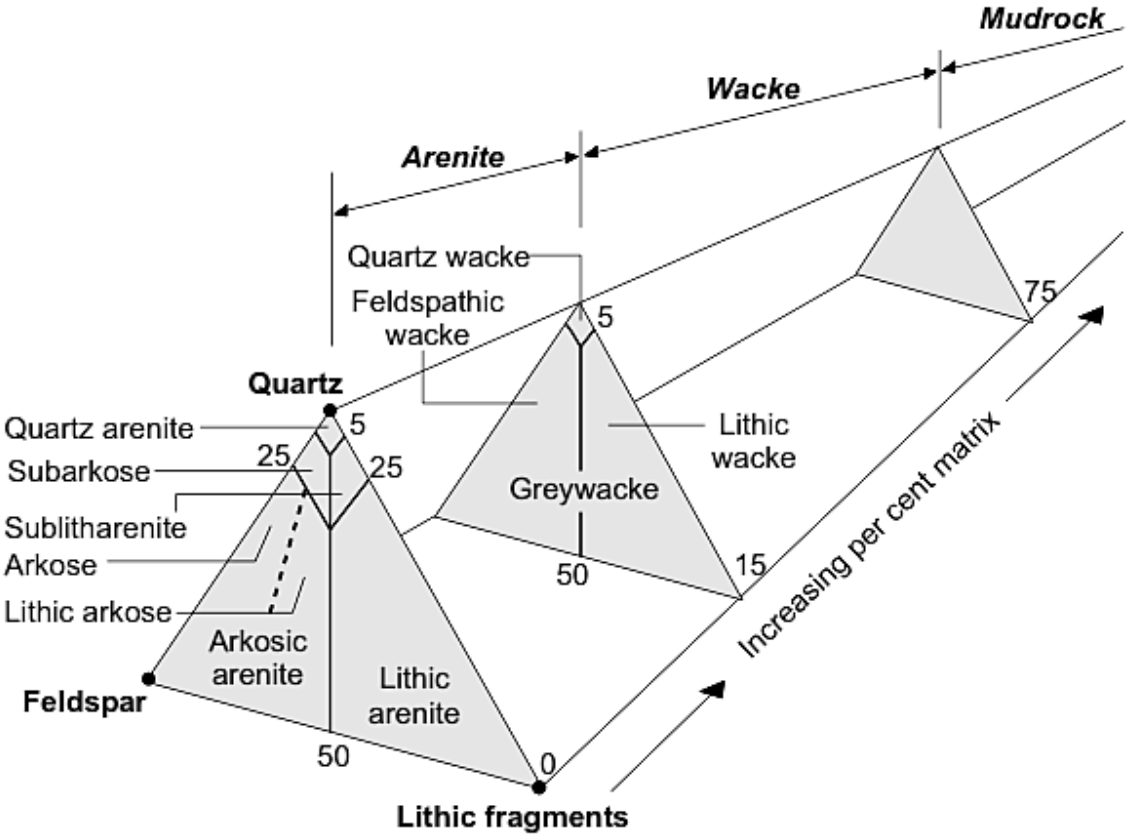
DEPOSITIONAL				BIOLOGICAL			DIAGENETIC			
Matrix-supported (clay & silt grade)		Grain-supported		In-situ organisms			Non-obliterative			Obliter-ative
< 10% grains	> 10% grains	with matrix	no matrix	Encrusting binding organisms	Organisms acted to baffle	Rigid organisms dominant	Main component is cement	Many micro-stylolitic grain contacts	Mostly micro-stylolitic grain contacts	Crystals > 10 μm
Calci-mudstone	Wacke-stone	Pack-stone	Grain-stone	Bound-stone	Baffle-stone	Frame-stone	Cement-stone	Condensed grainstone	Fitted grainstone	Spar-stone
	Float-stone	Rud-stone								Crystals < 10 μm
	Grains > 2mm									Microspar-stone



Sumber Gambar : Scholle & Scholle (2003)

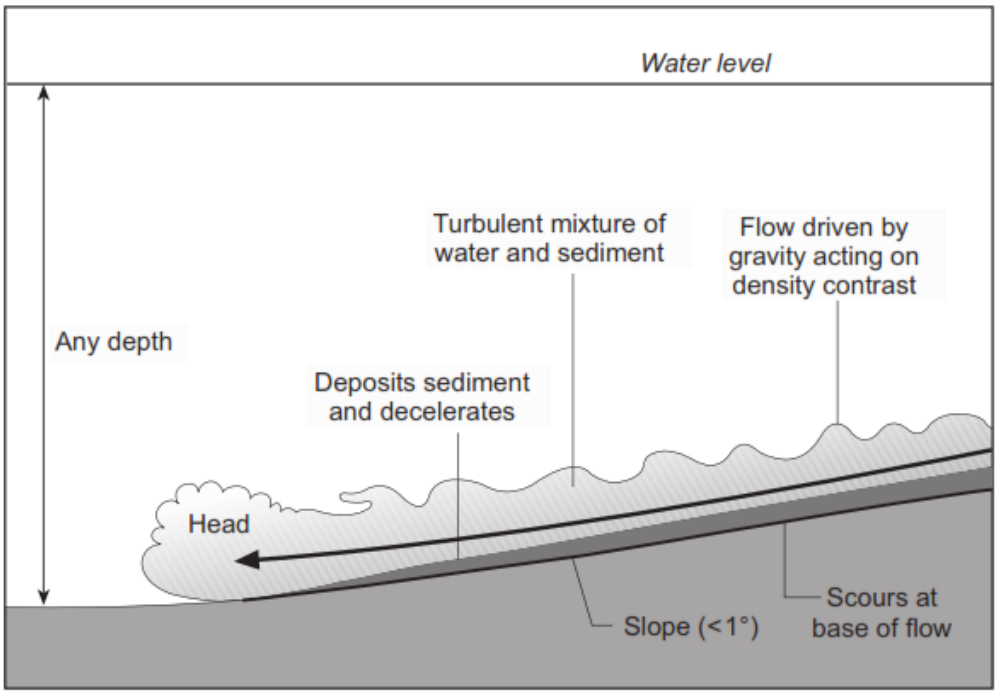
10. KLASIFIKASI BATUAN SILISIKLASTIK

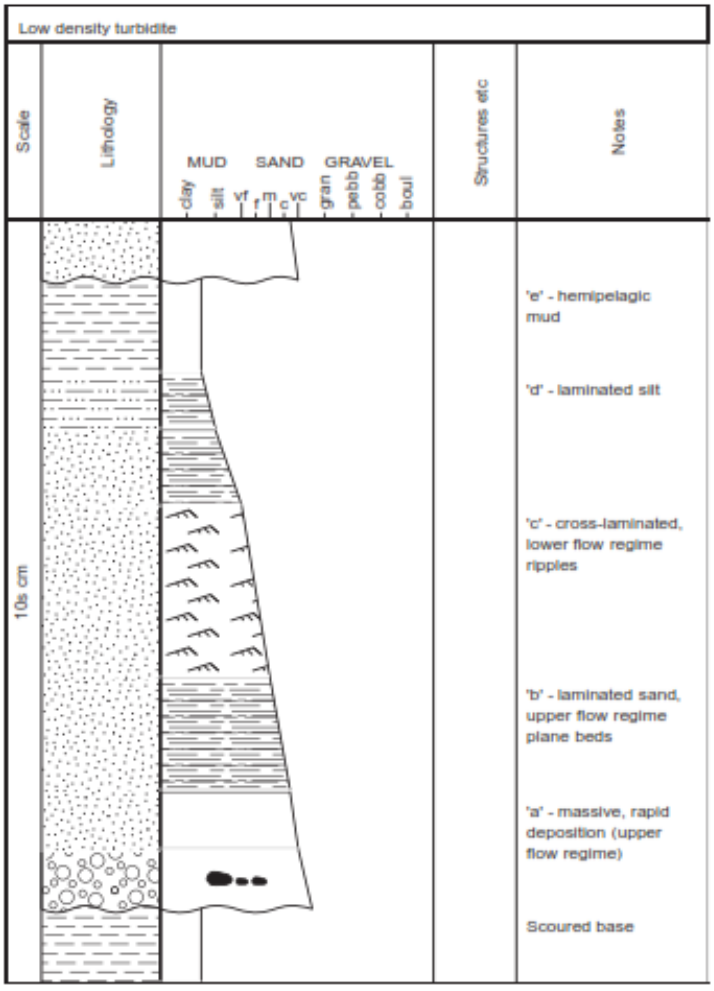
Pettijohn (1975)



Sumber Gambar : Nichols (2009)

Bouma Sequence





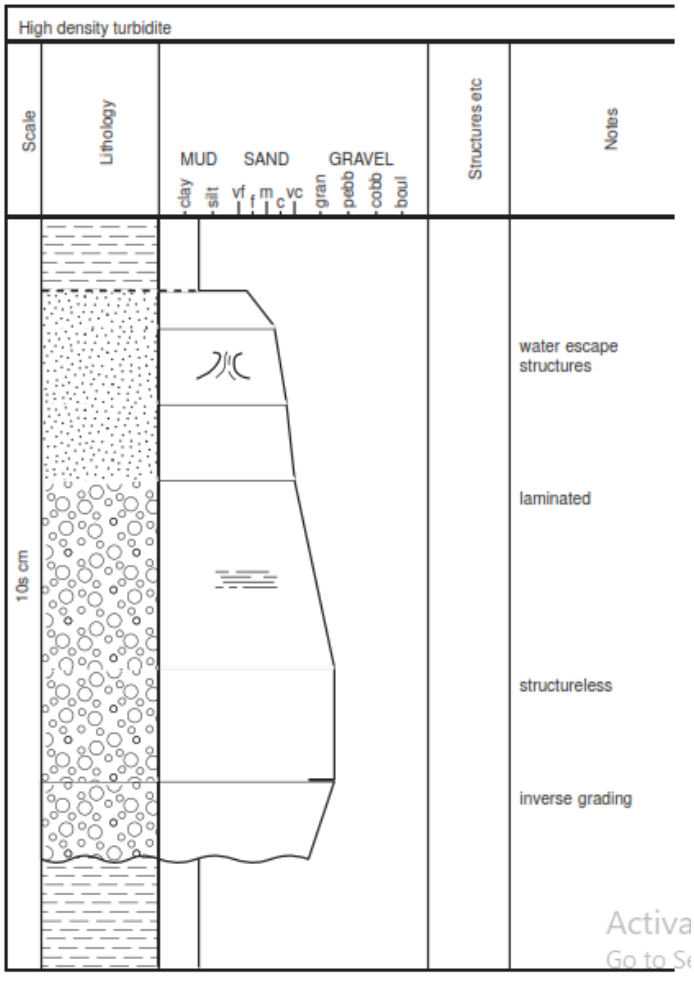


Fig. 4.29 The 'Bouma sequence' in a turbidite deposit.

Bouma Sequence

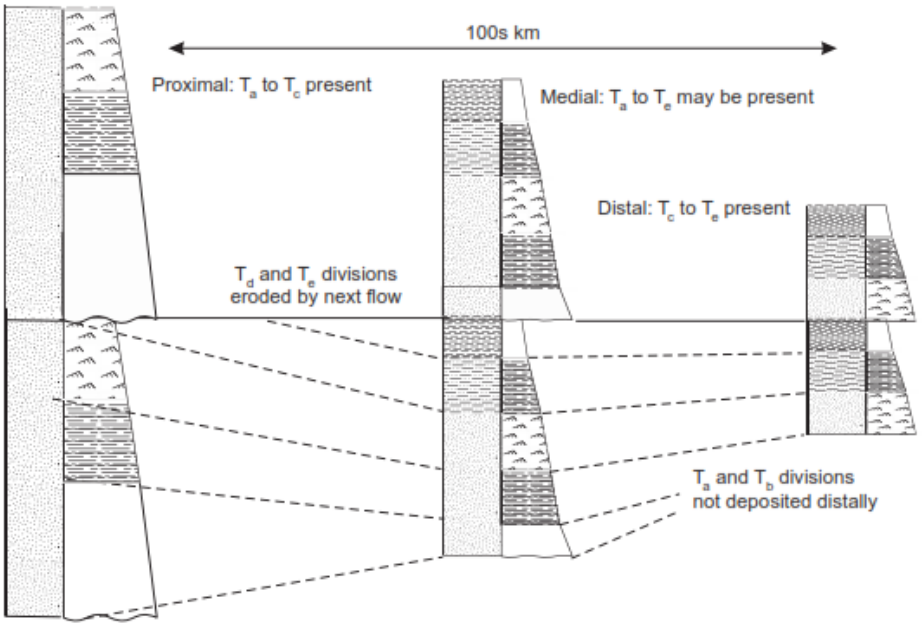
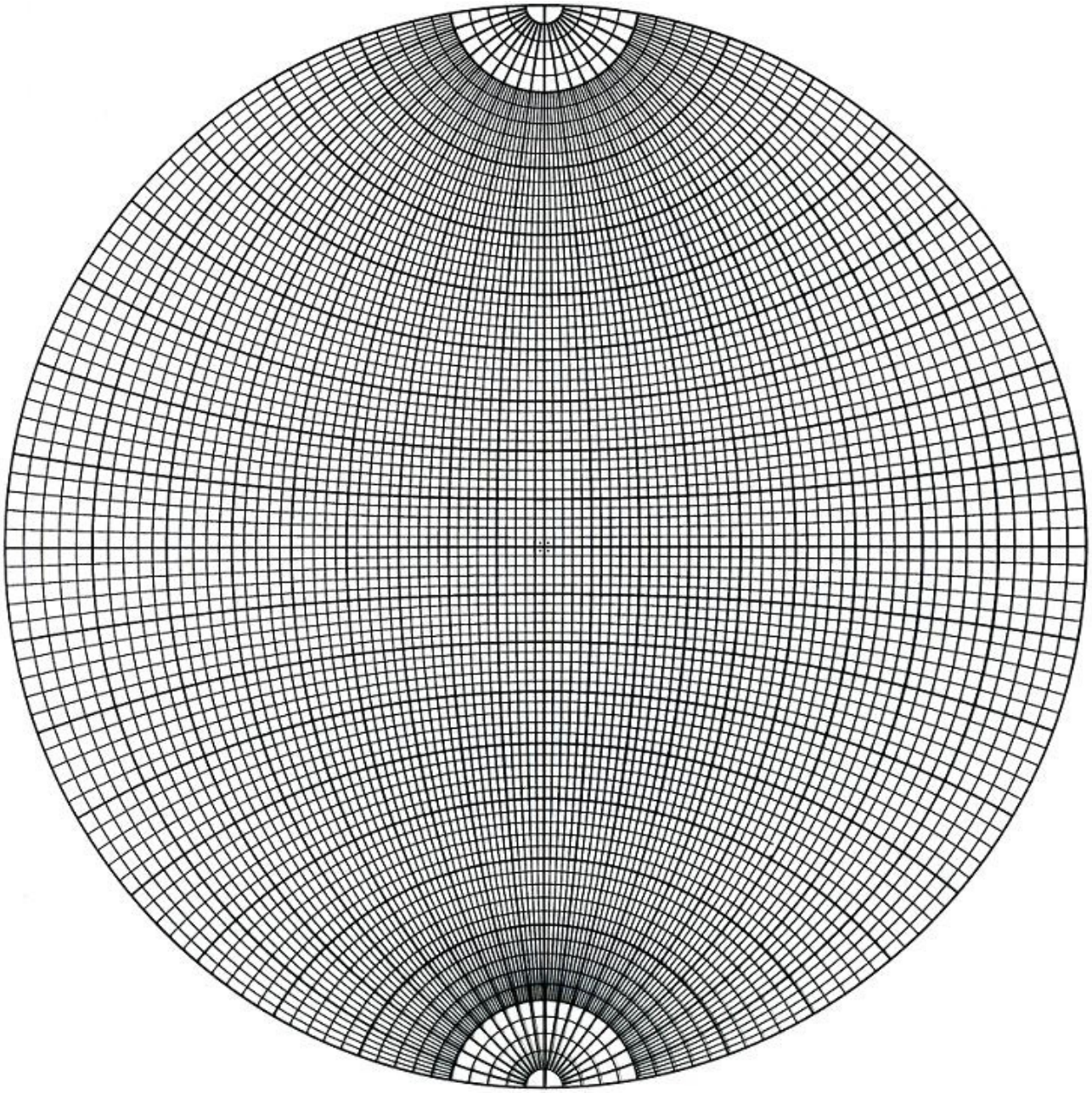


Fig. 4.30 Proximal to distal changes in the deposits formed by turbidity currents. The lower, coarser parts of the Bouma sequence are only deposited in the more proximal regions where the flow also has a greater tendency to scour into the underlying beds.

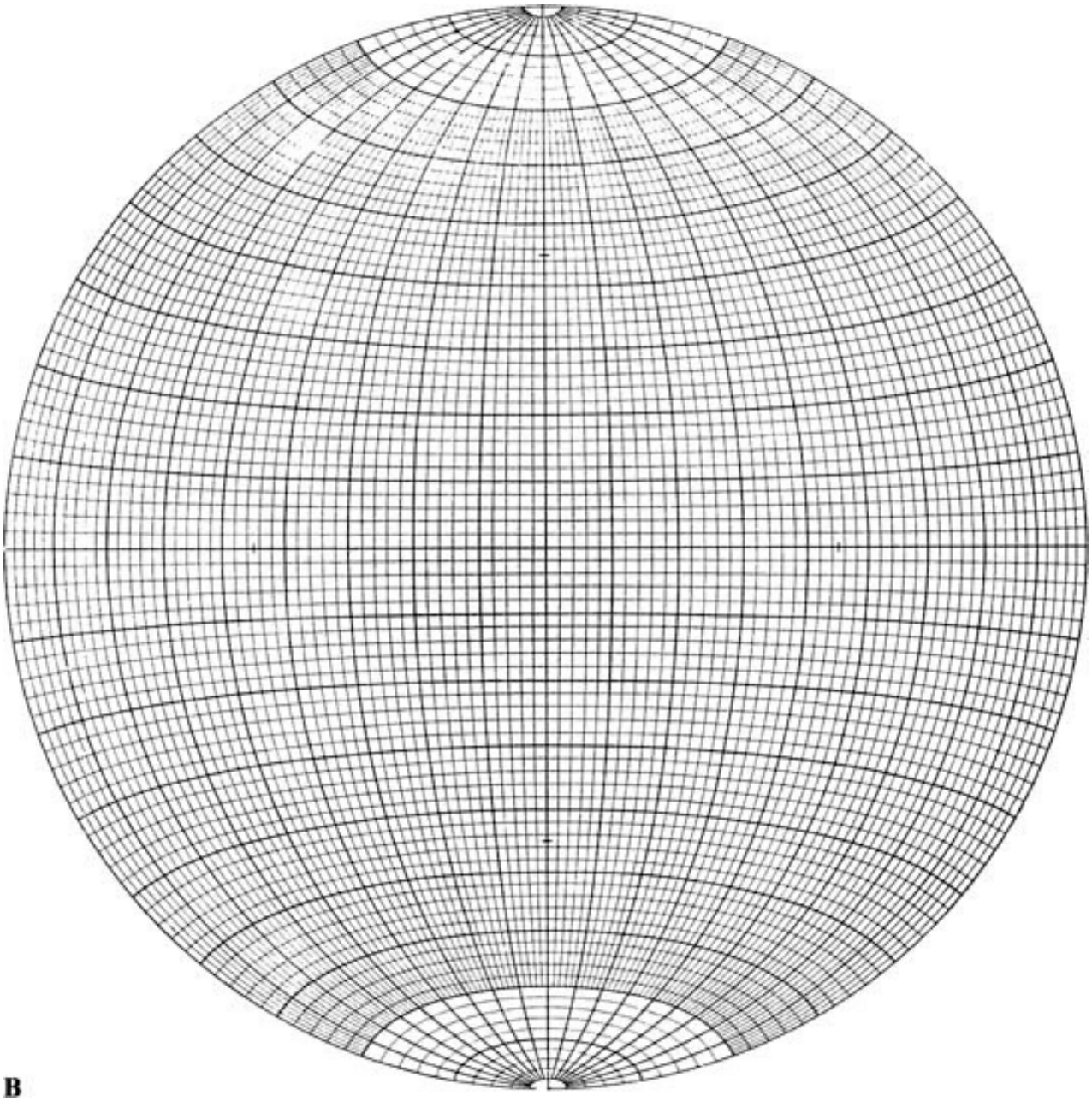
Sumber Gambar : Nichols (2009)

11. ANALISIS STEREONET

WULFF NET



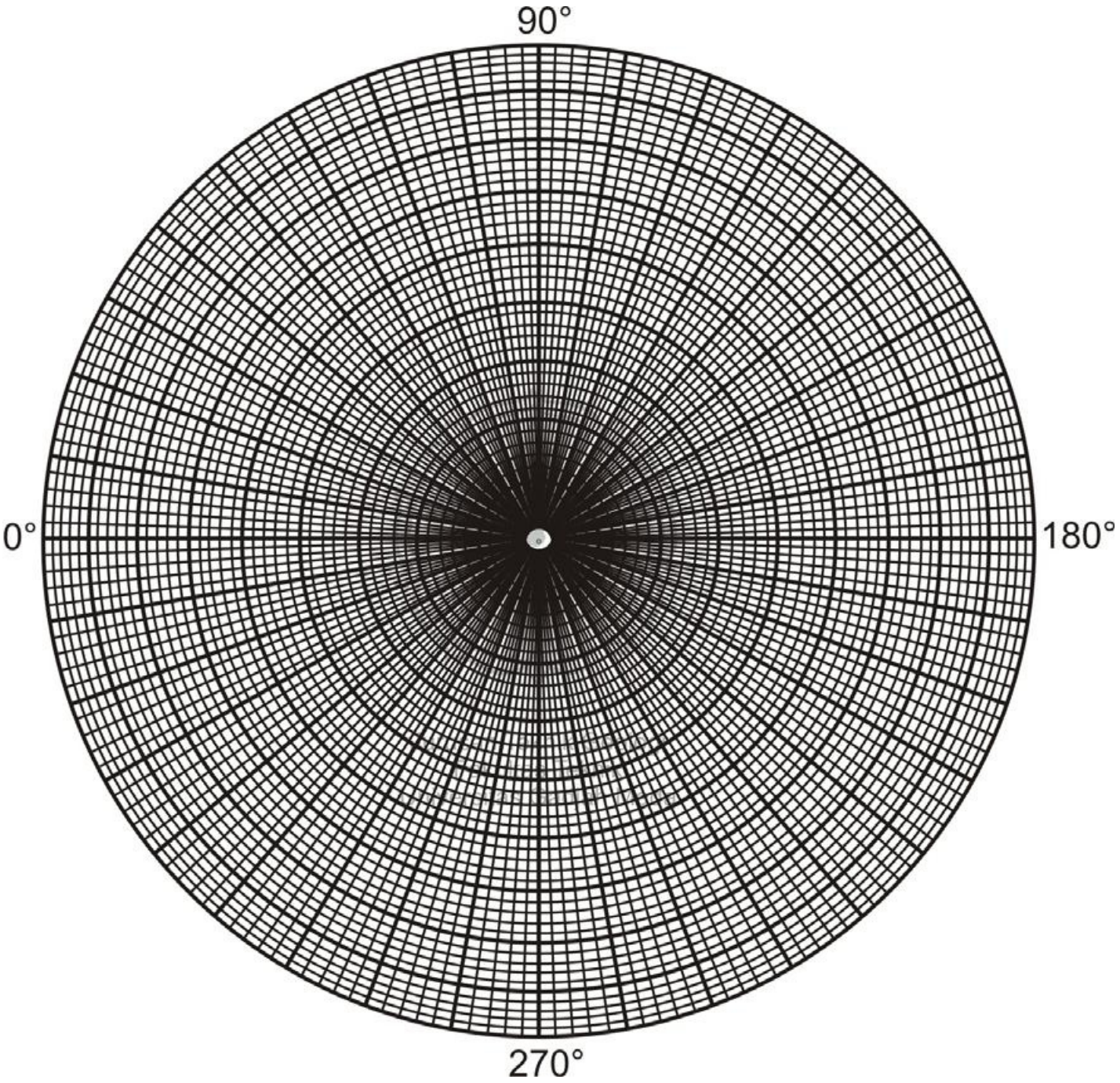
SCHMIDT NET



B

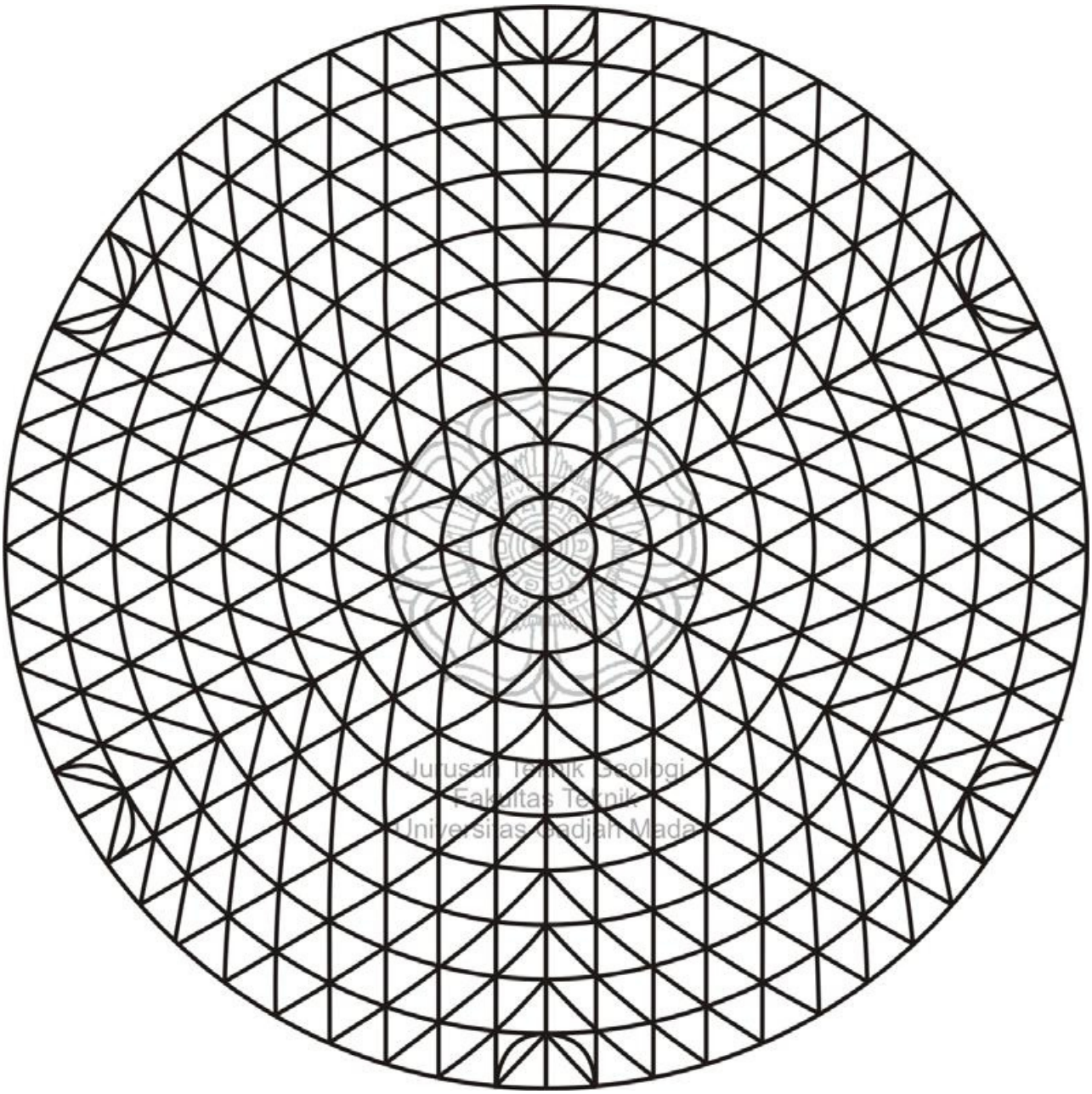
11. ANALISIS STEREONET

POLAR NET



11. ANALISIS STEREONET

KALSBEEK NET



Tanggal ______________________

Daerah ______________________

Cuaca ______________________

Cuaca ______________________

Koordinat X ______________________

Koordinat Y ______________________

STA	LP	

Catatan :

KEMENTERIAN RISET DAN TEKNOLOGI PENDIDIKAN TINGGI
UNIVERSITAS MULAWARMAN
FAKULTAS TEKNIK
PROGRAM STUDI TEKNIK GEOLOGI

KOLOM STRATIGRAFI TERUKUR

SKALA 1 : 50

SKETSA JALUR PENGUKURAN

INFORMASI PENGUKURAN

Tanggal pengukuran	
Koordinat GPS	
Formasi	
Jalur / Area	
Ketebalan terukur	
Cuaca	
Diukur oleh	
Diperiksa oleh	

LEGENDA FASIES

LITOLOGI
- Batugamping
- Batulempung
- Batunapal
- Batupasir
- Conglomerate

STRUKTUR SEDIMEN
- Laminasi paralel
- *Trough Cross Bedding*
- *Planar Cross Bedding*
- Fosil Jejak / Bioturbasi
- Kedudukan bidang perlapisan
- *Load cast*
- *Scouring*
- Imbrikasi
- *Blank zone*
- Fragmen Oncoid

KANDUNGAN FOSIL
- *Discocyclina*
- *Nummulites*
- *Planocamerinoides*
- *Alveolina*
- *Echinoids*

UMUR GEOLOGI	SATUAN BATUAN	KETEBALAN	UKURAN BUTIR (MS, WS, PS, GS, FS, RS, BS; Clay; SAND: S, F, M, C, VG, G; Pb, Cb, B)	NOMOR SAMPEL	NOMOR FOTO	STRUKTUR SEDIMEN/ FOSIL	DESKRIPSI LITOFASIES	FOTO SINGKAPAN	ASOSIASI FASIES	*PALEO-ENVIRONMENT*
		13 12 11 10 9 8 7 6 5 4 3 2 1								

KETERANGAN PENGAMBILAN SAMPEL

DR/SWG1/01 : Sampel paleontologi disayat
DR/SWG1/02 : Sampel paleontologi diayak
DR/SWG1/02 : Sampel tidak disayat

Lampiran | Halaman