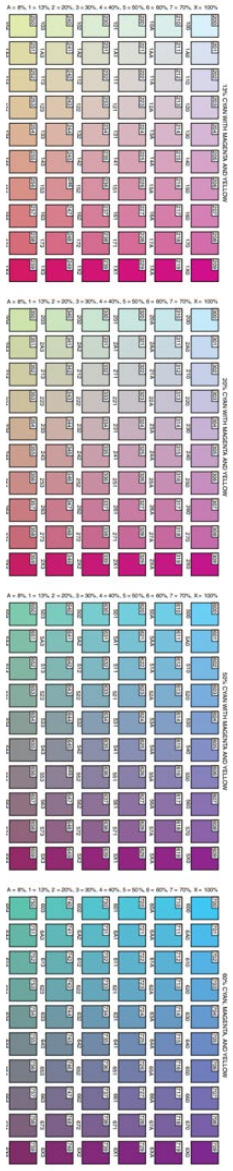


COLORS

COLOR OPTIMIZATION METRICS FOR GEOLOGIC MAPS

BEYOND THE BASICS OF GEOLOGIC MAP DATABASE QA/QC

Ally Steinleitner
Digital Mapping Techniques Conference
5/21/2025

Alaska Division of Geological & Geophysical Surveys
3354 College Rd, Fairbanks AK 99709

AK GeMS QA/QC focused workflow phases

QA (*don't make mistakes*)

- Phase 2: Production
- Phases 5: Data Prep

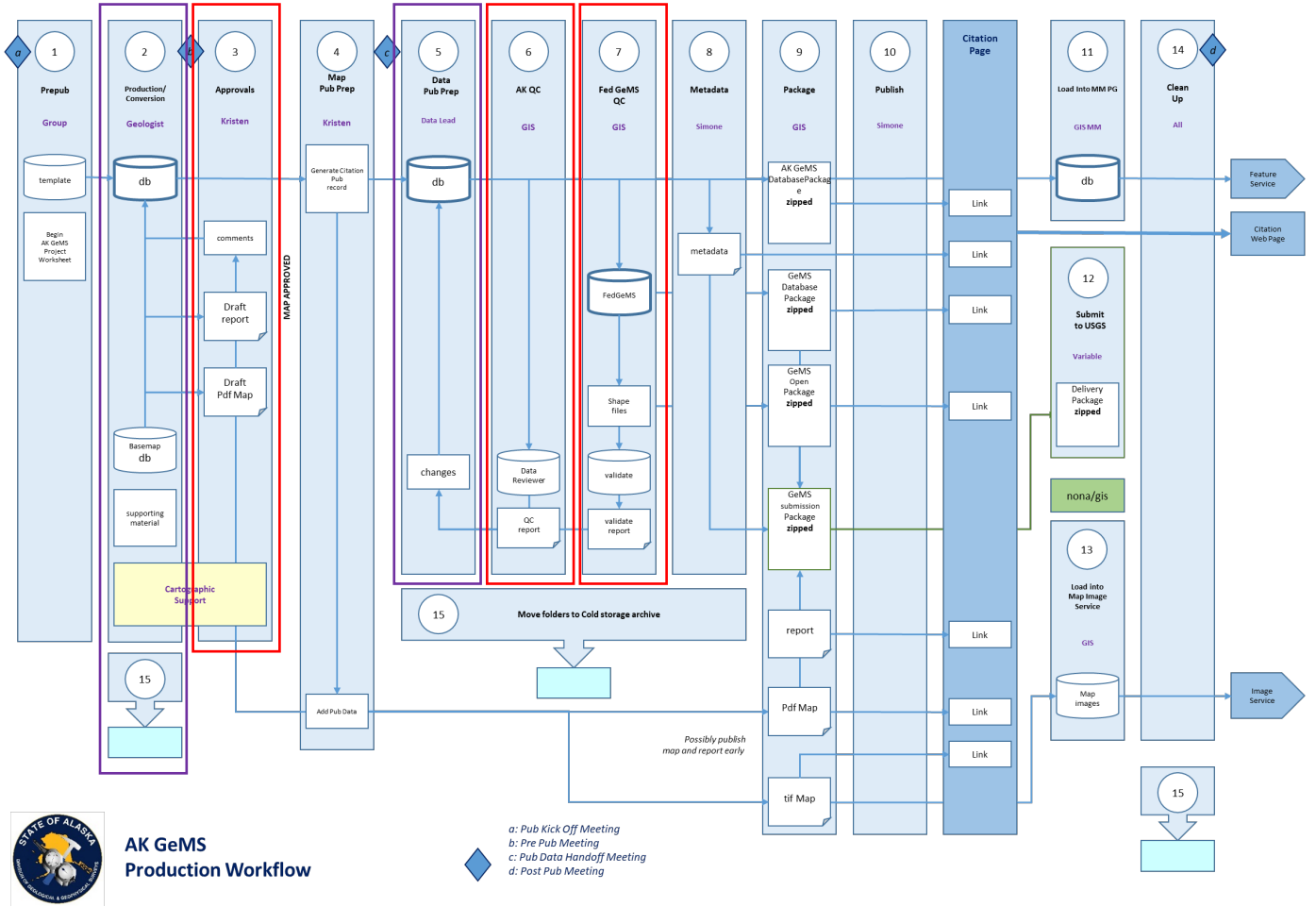
QC (*find mistakes*)

- Phase 3: Approvals
- Phases 6-7: GeMS QC

QA/QC Accomplished with:

- Data Reviewer
- Python Scripts
- Implementing Attribute Rules

AK GeMS Production Workflow



Currently leveraging Esri advantage Program credits to leverage Tasks and upgrade data reviewer processes to ArcPro 3.x

AK DGGS Color Review

Phase 2

Colors chosen by geologist

Phase 3

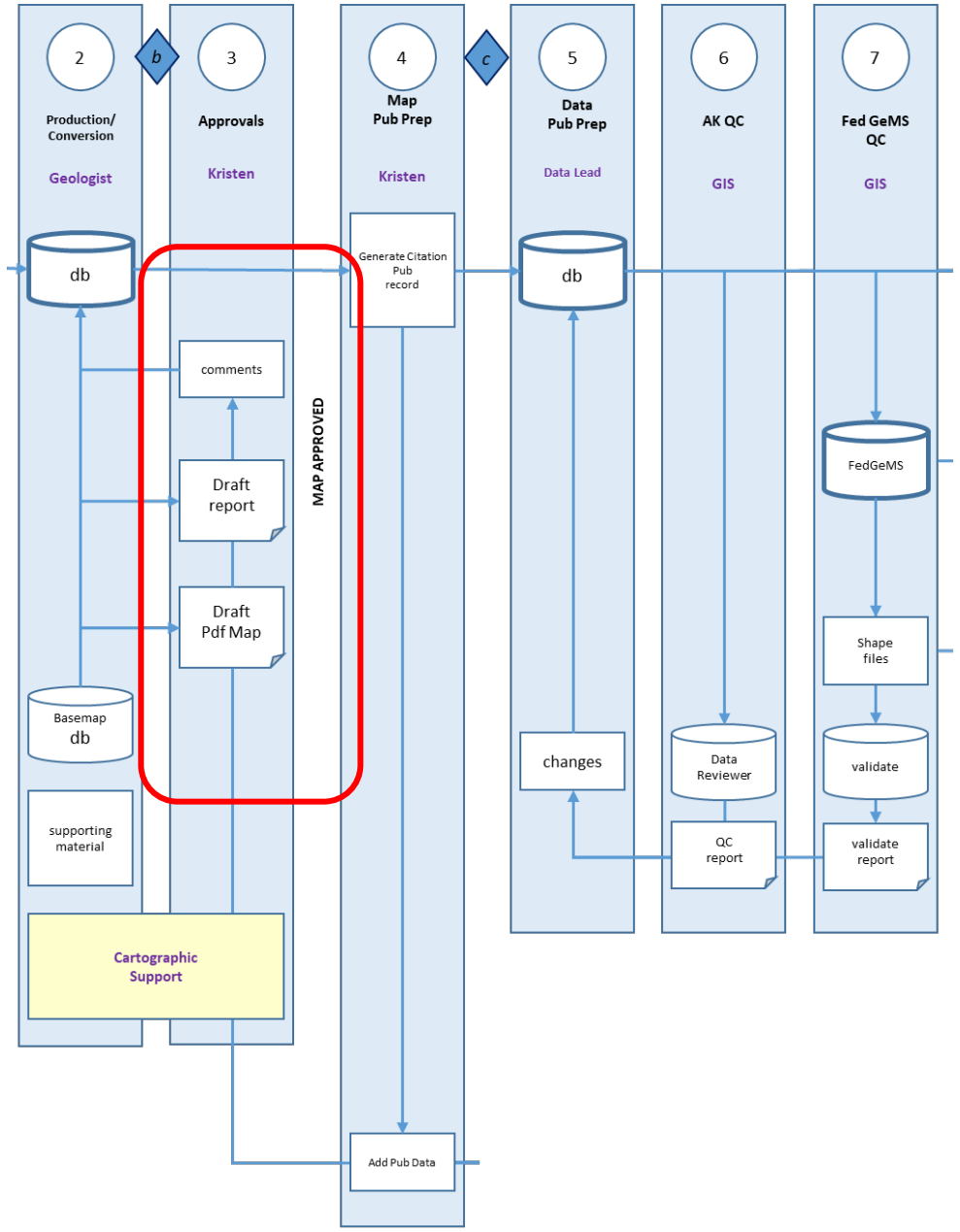
Colors checked manually by reviewers

Description Of Map Units Table

description_of_map_units

Field: Add | Calculate | Selection: Select By Attributes | Switch | Clear | Delete | Copy | Rows: Insert

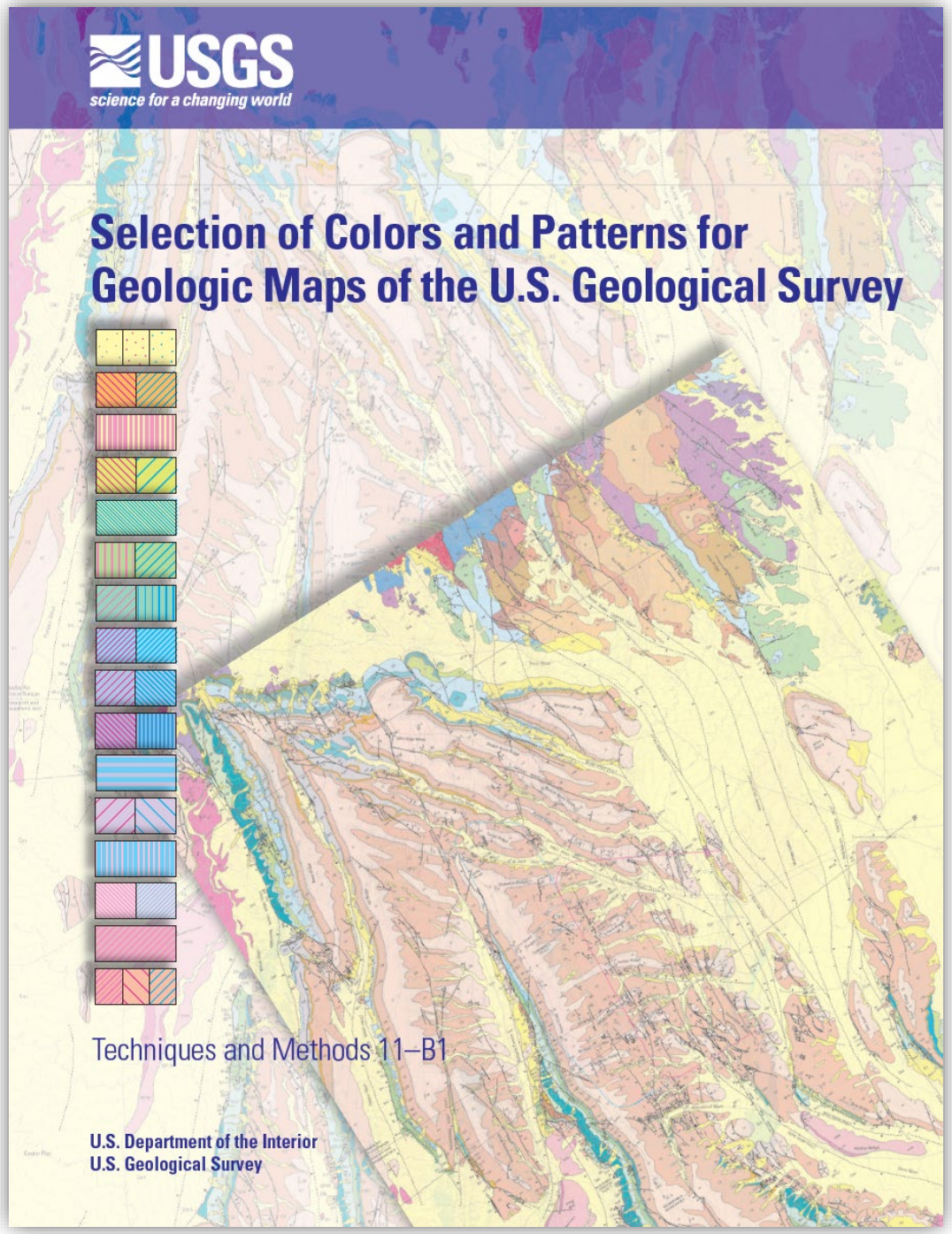
	OBJECTID *	description_of_map_u...	symbol	map_unit *	name	full_name	age_label	age_type	age_oldest	age_youngest	description
1	1	{9B2EDCB5-CC28-408B...	<Null>	<Null>	UNCONSOLIDATED DE...	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
2	2	{E2F7AD4F-D56E-4A72...	0070	Qs	Surficial deposits	Surficial deposits (Hol...	Holocene	relative	Holocene	Holocene	Consists primarily of al...
3	3	{3D851138-8A84-4F8D-...	<Null>	<Null>	METAMORPHIC AND P...	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
4	4	{CAD60F3D-2401-49AB...	2220	pv	Prevolcanic bedrock	Prevolcanic bedrock (T...	Tertiary and Cretaceous	relative	Cretaceous	Tertiary	Consists of the Sitka G...
5	5	{09703F10-484F-4C52-...	<Null>	<Null>	VOLCANIC ROCKS AN...	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
6	6	{C1A84F07-988A-491A-...	0700	Qcrd	Dacite lava flows of Cr...	Dacite lava flows of Cr...	Holocene	relative	Holocene	Holocene	Dark brownish gray, v...
7	7	{39A996E3-3919-4FA5-...	0030	Qcrp	Pyroclastic-flow depos...	Pyroclastic-flow depos...	Pleistocene	relative	Pleistocene	Pleistocene	Pumiceous lapilli are l...
8	8	{9B2A6701-A62D-459A...	0150	Qmet	Dacite air-fall tuffs of...	Dacite air-fall tuffs of...	Pleistocene	relative	Pleistocene	Pleistocene	Pumiceous lapilli and...
9	9	{B5B8C5C4-9B86-4EF1-...	0170	Qsma	Basaltic and andesite l...	Basaltic and andesite l...	Pleistocene	relative	Pleistocene	Pleistocene	Post-glacial, heavily ve...
10	10	{AB24447F-B7DA-4BAB...	04X0	Qmea	Andesite air-fall tuffs...	Andesite air-fall tuffs...	Pleistocene	relative	Pleistocene	Pleistocene	Red-brown and dark-...
11	11	{A82CCE2A-B0AC-4D3...	06X0	Qmed	Andesite dome of Mo...	Andesite dome of Mo...	Pleistocene	relative	Pleistocene	Pleistocene	Porphyritic, holocrysta...
12	12	{48849150-D49D-4BD0...	2660	Qsca	Andesite air-fall tuffs	Andesite air-fall tuffs (...	Pleistocene	relative	Pleistocene	Pleistocene	Postglacial. Unit consi...
13	13	{5A2A1C6D-0E6C-4D75...	4760	Qscb	Basalt and basaltic an...	Basalt and basaltic an...	Pleistocene	relative	Pleistocene	Pleistocene	Postglacial. Unit differ...
14	14	{952171F2-F8DD-4FA5-...	0470	Qcrr	Low-silica rhyolite do...	Low-silica rhyolite do...	Pleistocene	absolute	Pleistocene	Pleistocene	Dark gray, commonly f...
15	15	{ADB1569B-6D30-4084...	7300	Qbpy	Younger plagioclase b...	Younger plagioclase b...	Pleistocene	absolute	Pleistocene	Pleistocene	Postglacial(?). Exposed...
16	16	{F858881D-036D-4470-...	2530	Qmec	Andesite lava flows an...	Andesite lava flows an...	Pleistocene	absolute	Pleistocene	Pleistocene	Medium gray or grayis...
17	17	{730F199E-3EBF-4F10-...	X400	Qcra	Andesite lava flows of...	Andesite lava flows of...	Pleistocene	relative	Pleistocene	Pleistocene	Glaciated(?). Gray or gr...
18	18	{B28F2756-93E0-4530-...	0360	Qcea	High-silica andesite la...	High-silica andesite la...	Pleistocene	relative	Pleistocene	Pleistocene	Sparsely porphyritic, t...
19	19	{1D36D9F7-EB3D-4E37...	3620	Qsla	Andesite lava flows of...	Andesite lava flows of...	Pleistocene	relative	Pleistocene	Pleistocene	Dark gray lava pervasiv...

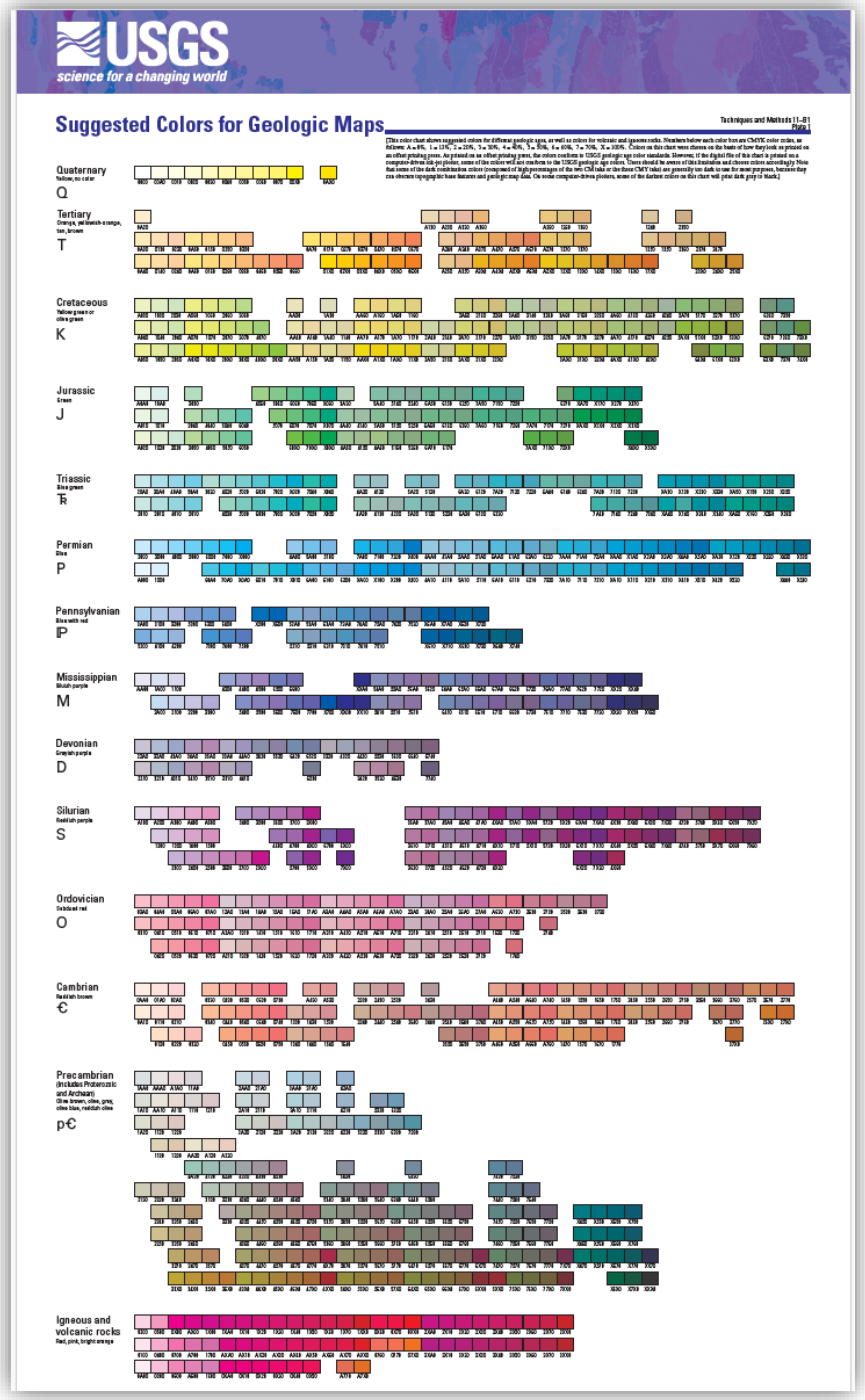


FGDC Geologic Color Standards

USGS Techniques and Methods 11-B1

- Purpose and use of the map
- Legibility of the map
- Showing contrast and clarity of map units and symbols
- Showing ages or age relationships of map units
- Showing structural relationships of map units
- Matching or approximating colors and patterns used on nearby or adjacent maps to maintain consistency and continuity of colors and patterns among maps in a region





Suggested Colors for Geologic Maps

Table 1. Suggested colors for geologic maps. CMYK values: A = 8%, 1 = 13%, 2 = 20%, 3 = 30%, 4 = 40%, 5 = 50%, 6 = 60%, 7 = 70%, X = 100%.

Geologic age	Basic color	Color combination	Selected color samples
Quaternary Q	Yellow or no color (white)	Tints of yellow (30% and 50% are best to use, except in narrow bands or very small areas) or no color (white).	0000 0030 0050 00X0
Tertiary T	Orange, yellowish orange, tan, brown	Combinations of yellow and magenta, with proportionally more yellow than magenta.	A130 0270 A570 16X0
Cretaceous K	Yellow green or olive green	Combinations of yellow and cyan, with proportionally more yellow than cyan; the addition of a small proportion of magenta produces olive greens.	A030 3070 4260 63X0
Jurassic J	Green	Combinations of yellow and cyan in equal or nearly equal proportions. Note: in theory, this is the correct color for Jurassic; however, in practice it is well to lean toward the conventional "blue greens" when possible.	3030 6060 6160 X0X0
Triassic Ŧ	Blue green	Combinations of yellow and cyan, with proportionally more cyan than yellow.	30A0 5030 6A30 6240
Permian P	Blue	Tints of cyan; a small proportion of magenta is often needed to increase contrast.	2000 5000 6200 62A0
Pennsylvanian ℙ	Blue with red	Combinations of cyan and magenta, with a much higher proportion of cyan than magenta.	3A00 3200 53A0 6400
Mississippian M	Bluish purple	Combinations of cyan and magenta, with the proportion of cyan only slightly higher than magenta.	1100 4300 5400 6500
Devonian D	Grayish purple	Combinations of equal or nearly equal proportions of magenta and cyan plus a low proportion of yellow.	32A0 3310 54A0 6410
Silurian S	Reddish purple	Combinations of magenta and cyan, with proportionally more magenta than cyan.	1200 1500 3400 3620
Ordovician O	Subdued red	Light tints of magenta or combinations of a high proportion of magenta with low proportions of yellow and cyan.	03A0 1310 2410 2630
Cambrian €	Reddish brown	Combinations of magenta and yellow in equal or nearly equal proportions plus a low proportion of cyan.	0120 1430 1660 3640
Precambrian* p€	Olive brown, olive, gray, olive blue, reddish olive	Combinations of equal or nearly equal proportions of yellow, magenta, and cyan.	11A0 4430 1240 3560 2140 5370 3220 6430

*Includes Proterozoic and Archean.

Color Challenges

Large maps with many map units

- Particularly large number of map units of any one geologic age

Guidance：

- select colors that maintain the relative order of colors on the geologic age column but move up and (or) down on the column.

- use the color immediately above the geologic age color for the youngest units, the correct color for the middle units, and the color immediately below the geologic age for the older units.

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*Includes Proterozoic and Archean.

Patterns

Help maintain basic color scheme on complex maps

Not factored into tools at this time

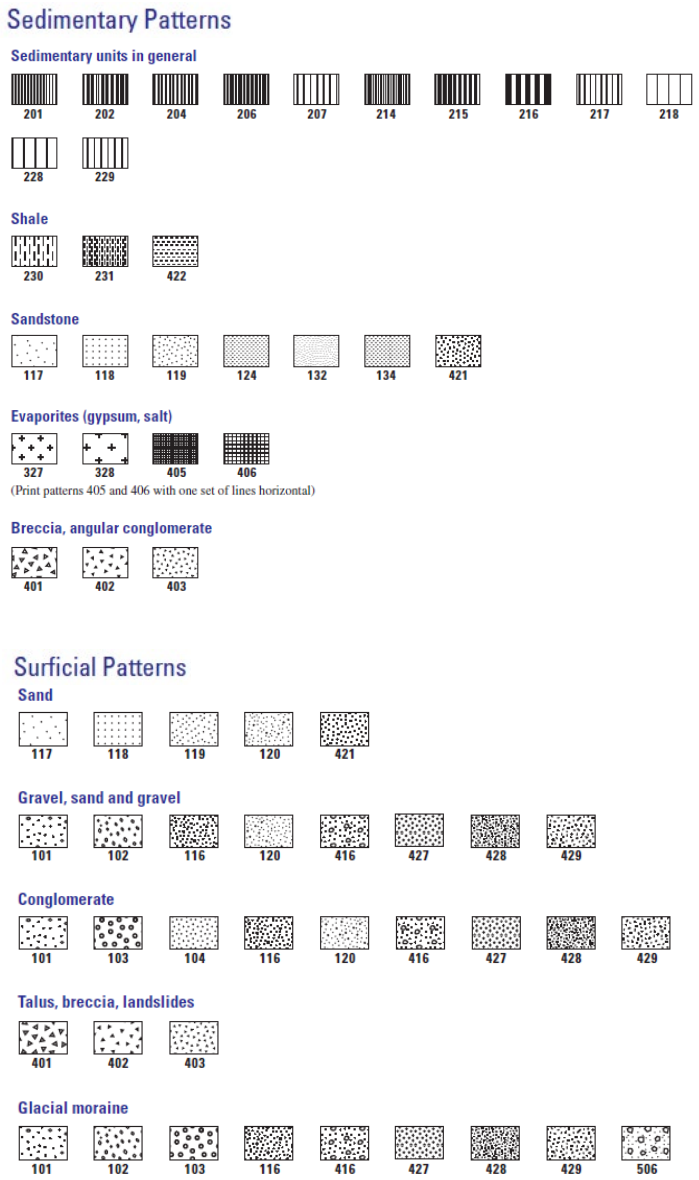


Table 3. Selected examples of ***background colors*** (CMYK codes shown below color boxes) and various **point patterns** (pattern numbers shown above color boxes) for geologic maps.
CMYK values: A = 8%, 1 = 13%, 2 = 20%, 3 = 30%, 4 = 40%, 5 = 50%, 6 = 60%, 7 = 70%, X = 100%.

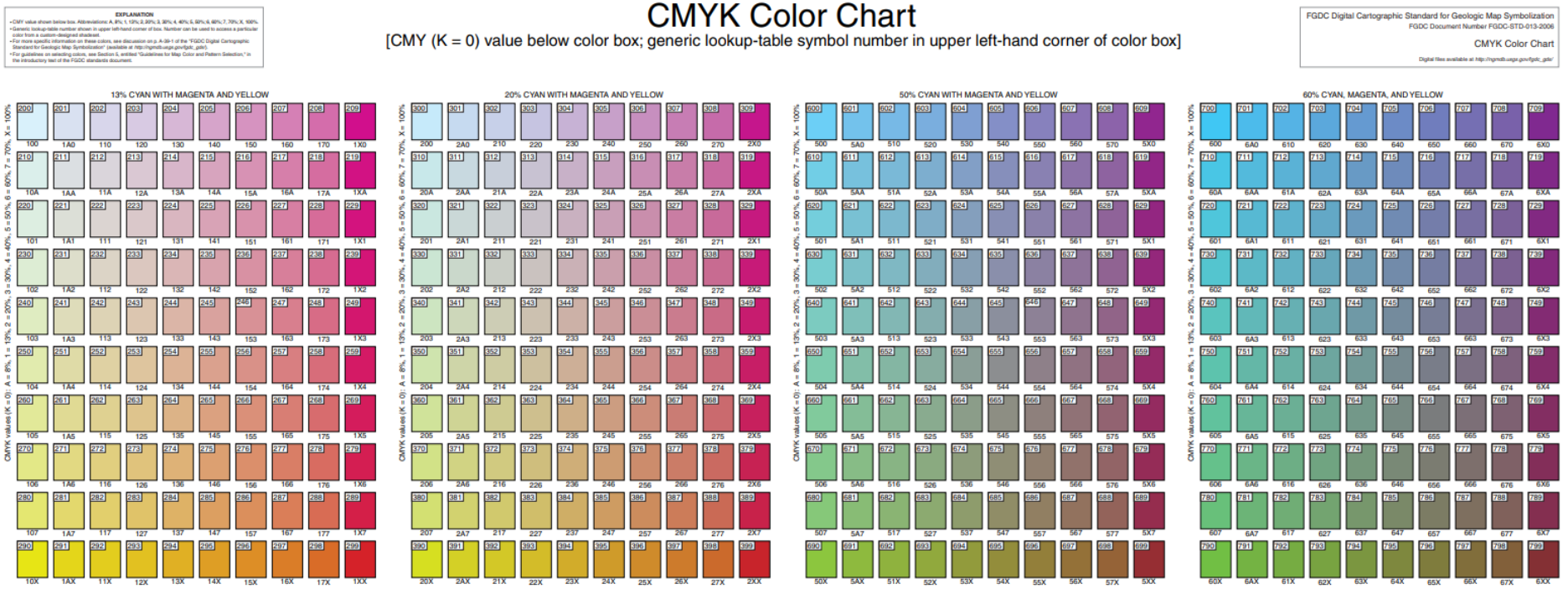
Geologic age	Pattern Color									
	C (X000)	M (0X00)	C (5000)	M (0500)	C (X000)	M (0X00)	C (X000)	M (0X00)	K (0005)	
Quaternary Q	101	0000	117	0030	429	0030	402	0030	101	0030
Tertiary T	101	A130	301	0270	318	0270	327	0270	101	0270
Cretaceous K	101	A030	427	3070	301	3070	327	3070	101	3070
Jurassic J	101	3030	118	6060	302	6060	317	6060	301	3030
Triassic Ŧ	101	30A0	416	6030	327	6030	314	6030	317	4020
Permian P	101	2000	429	6030	328	6030	317	6030	327	3000
Pennsylvanian Ᵽ	101	3A00	102	3200	317	3200	328	3200	328	3200
Mississippian M	101	1100	103	2200	318	4300	327	4300	319	2200
Devonian D	117	32A0	103	3220	319	3320	318	3320	314	32A0
Silurian S	117	1200	401	A300	303	1500	319	1500	101	A300
Ordovician O	117	03A0	116	A3A0	305	06A0	327	06A0	101	A3A0
Cambrian €	117	0120	118	02A0	315	2440	318	2440	101	02A0
rian*	117	2140	302	1230	306	1230	327	1230	416	1230

*Includes Proterozoic and Archean.

FGDC Key Recommendations

1. CMYK colors that differ by at least 30% for computer driven plotters

2. Colors maintain the relative order of colors on the geologic age column



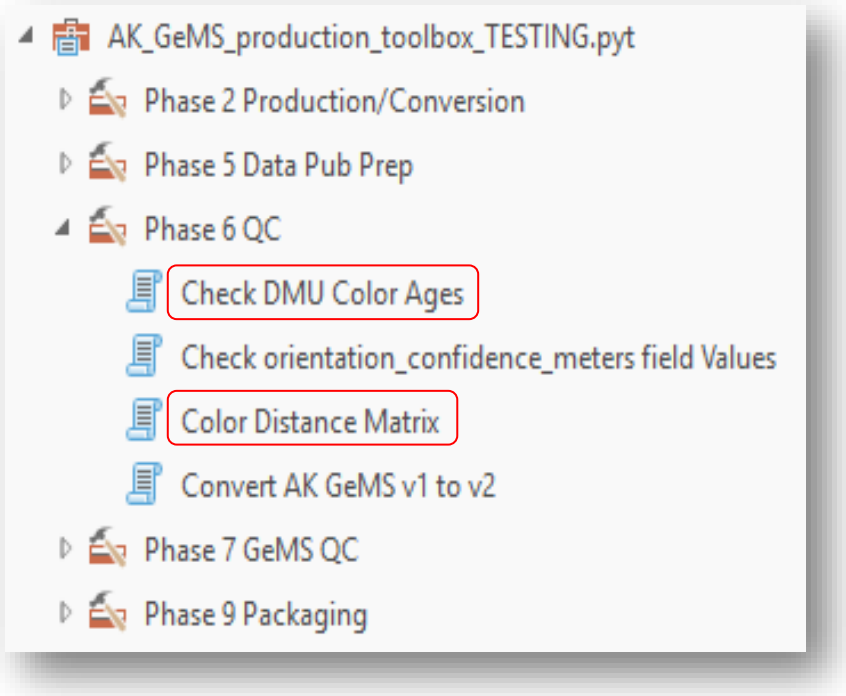
Developing Metrics

1. Human Readability

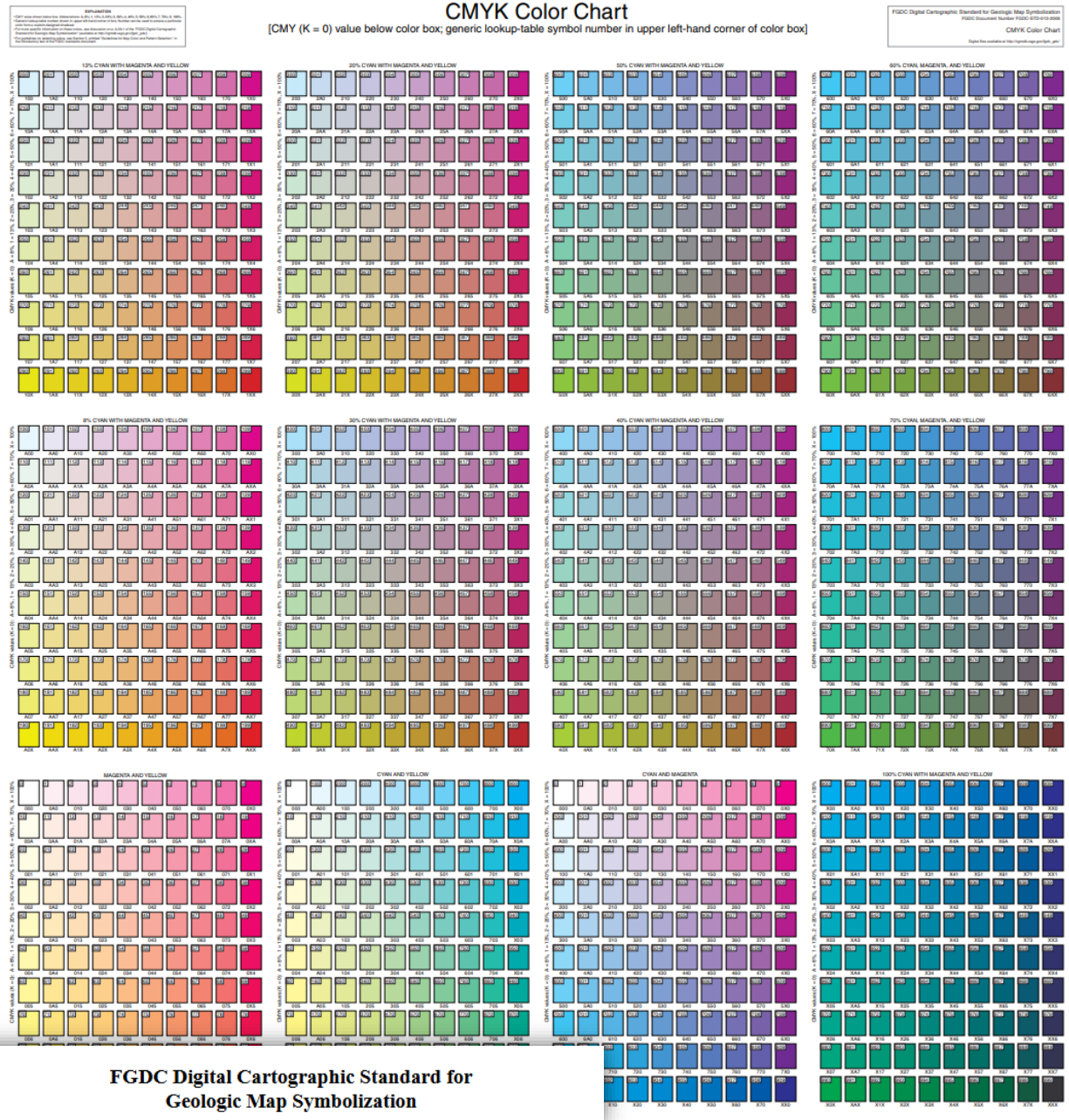
- Color Distance Matrix Tool

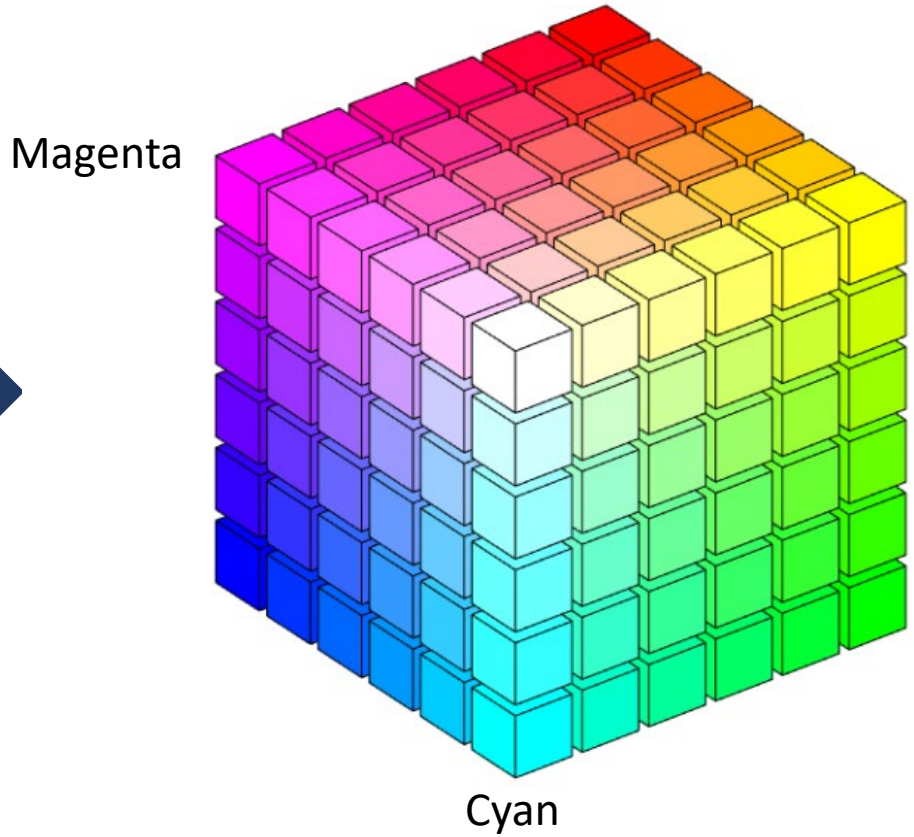
2. Adherence to Color Age Standards

- Check DMU Color Ages Tool



Exist in AK_GeMS_production_toolbox.pyt

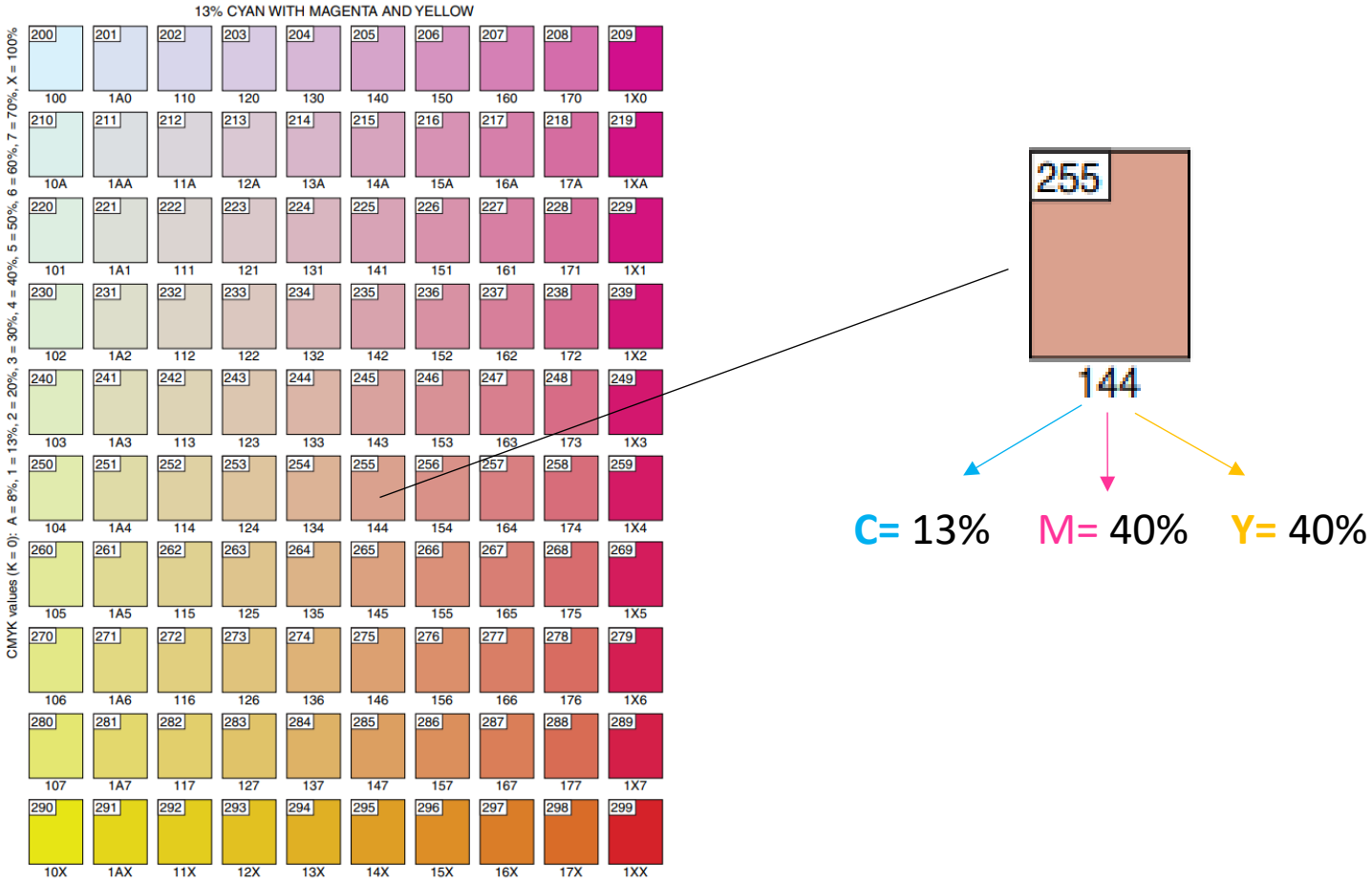

CMYK Color Chart
[CMY (K = 0) value below color box; generic lookup-table symbol number in upper left-hand corner of color box]
FGDC Digital Cartographic Standard for Geologic Map Symbolization


Magenta
Yellow
Cyan

Color Code Logic

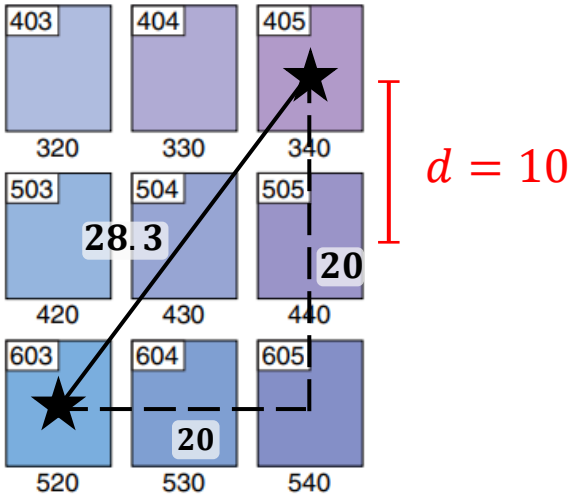
EXPLANATION

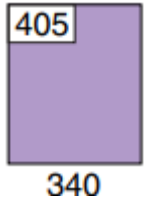
CMY value shown below box. Abbreviations: A, 8%; 1, 13%; 2, 20%; 3, 30%; 4, 40%; 5, 50%; 6, 60%; 7, 70%; X, 100%.



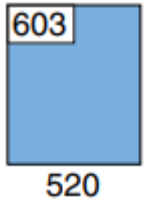
Color Distance Matrix Tool

Calculate the Euclidean distance between map units on 3D color cube





C= 30% M= 40% Y= 0%

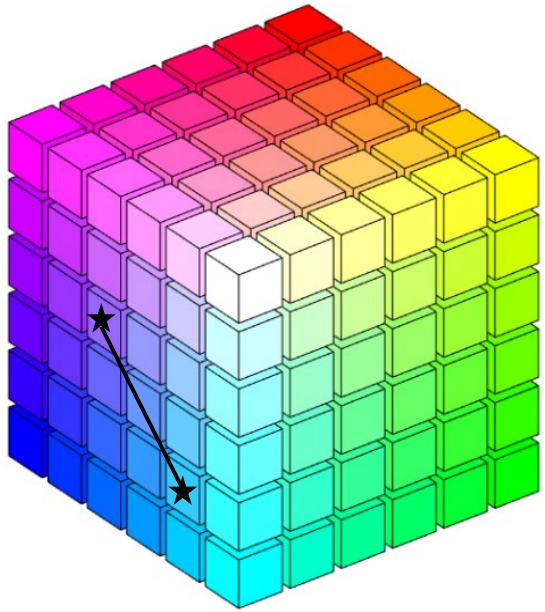


C= 50% M= 20% Y= 0%

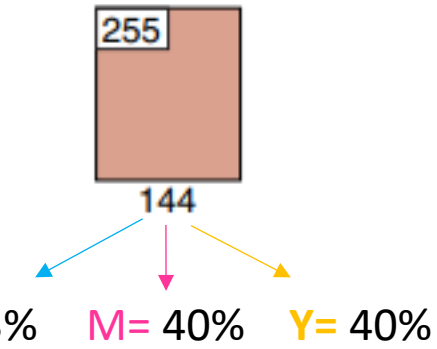
$$distance = \sqrt{(C1 - C2)^2 + (M1 - M2)^2 + (Y1 - Y2)^2}$$

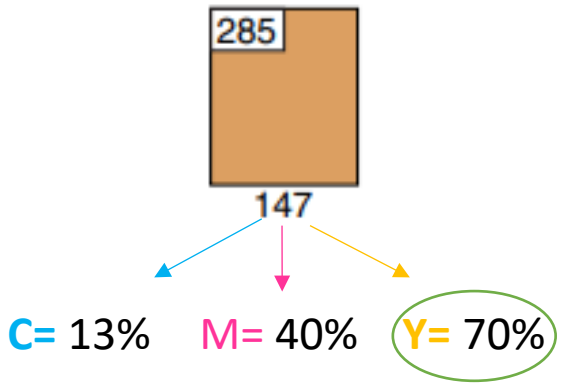
$$d = \sqrt{(30 - 50)^2 + (40 - 20)^2 + (0 - 0)^2}$$

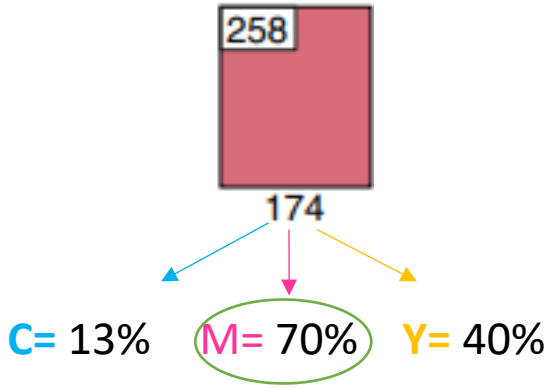
$$d = 28.3$$

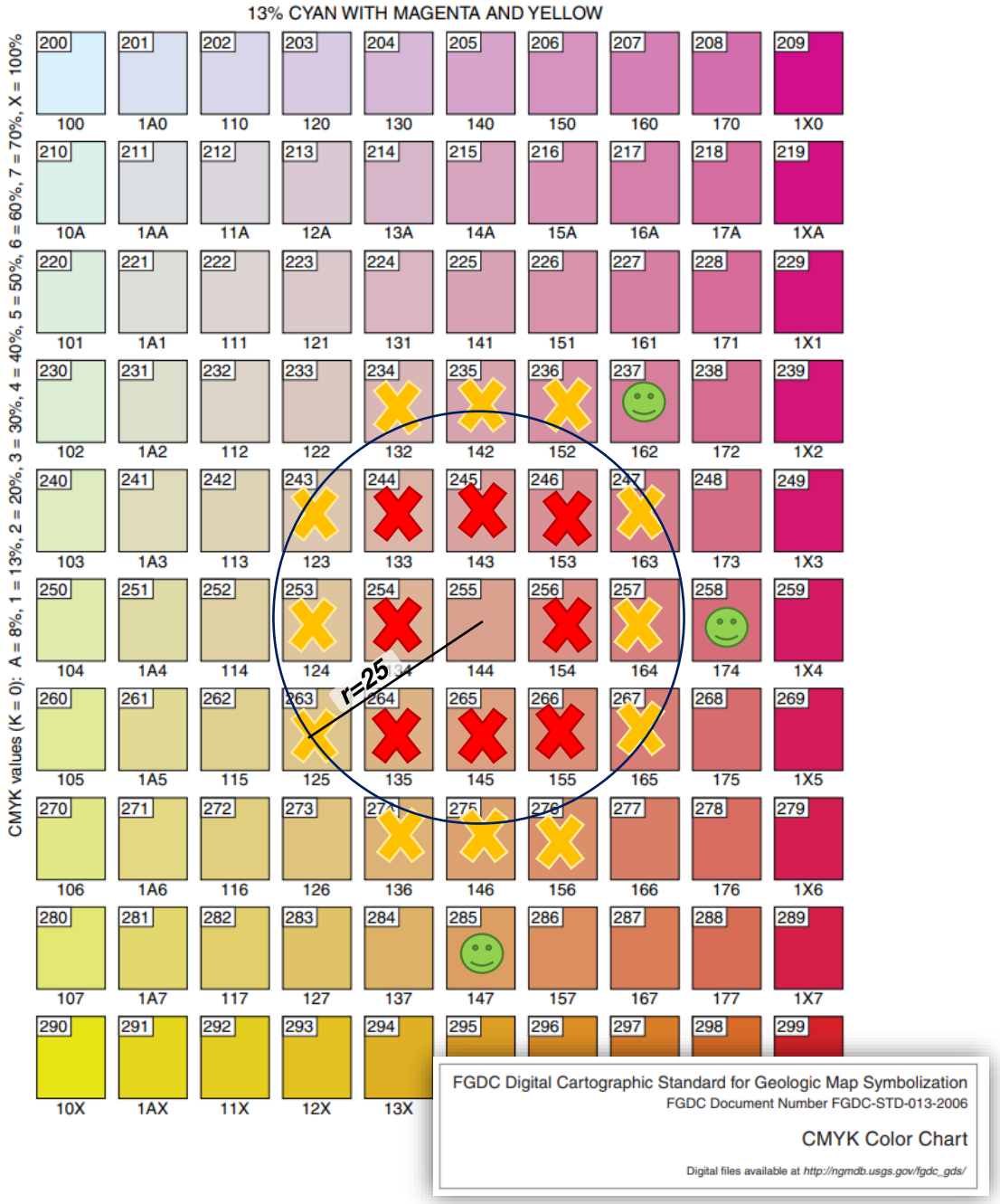


FGDC CMYK Color Chart



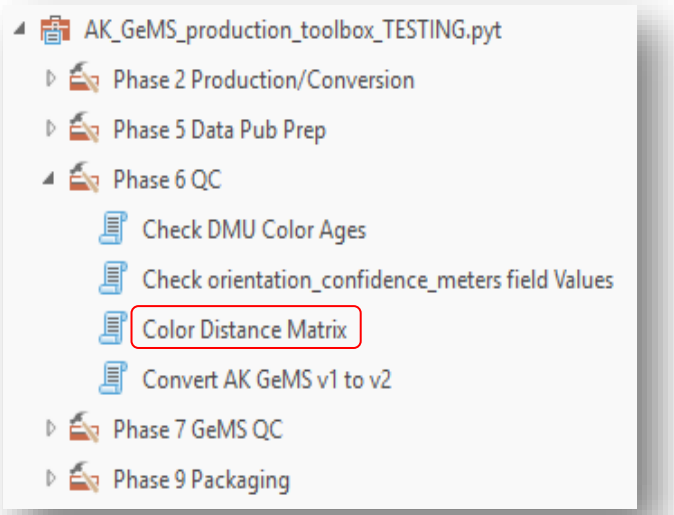






Color Distance Matrix Tool

- Distance matrix of the Euclidean distance between colors in DMU
- Average Euclidean distance between colors for a map

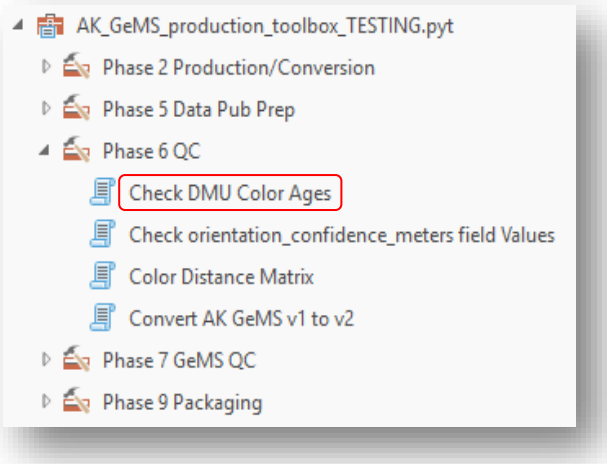


Map Unit	0010 Qal	0040 Qg	2030 Ksbls	3A40 Ksblb	2040 Ksblr	3150 Ktu	1050 Ks	4160 Kn	4240 Kt	Nearest Map Unit Color
Qal										
Qg	27									Qal
Ksbls	26.2	22.4								Qg
Ksblb	41.1	31	16.2							Ksbls
Ksblr	33.6	20	10	12.8						Ksbls
Ktu	49.4	34.2	25.9	11.2	19.2					Ksblb
Ks	39.2	16.4	21.2	21.3	12.2	21.4				Ksblr
Kn	63.1	46.6	38.3	22.9	31.1	14.1	31.6			Ktu
Kt	52.2	44.7	30	15.6	28.3	15.8	35.1	21.2		Ksblb
Average Dist	41.475	30.75714	23.6	16.76	22.7	17.1	33.35	21.2		25.86777

COLOR DISTANCE MATRIX TOOL

DEMO

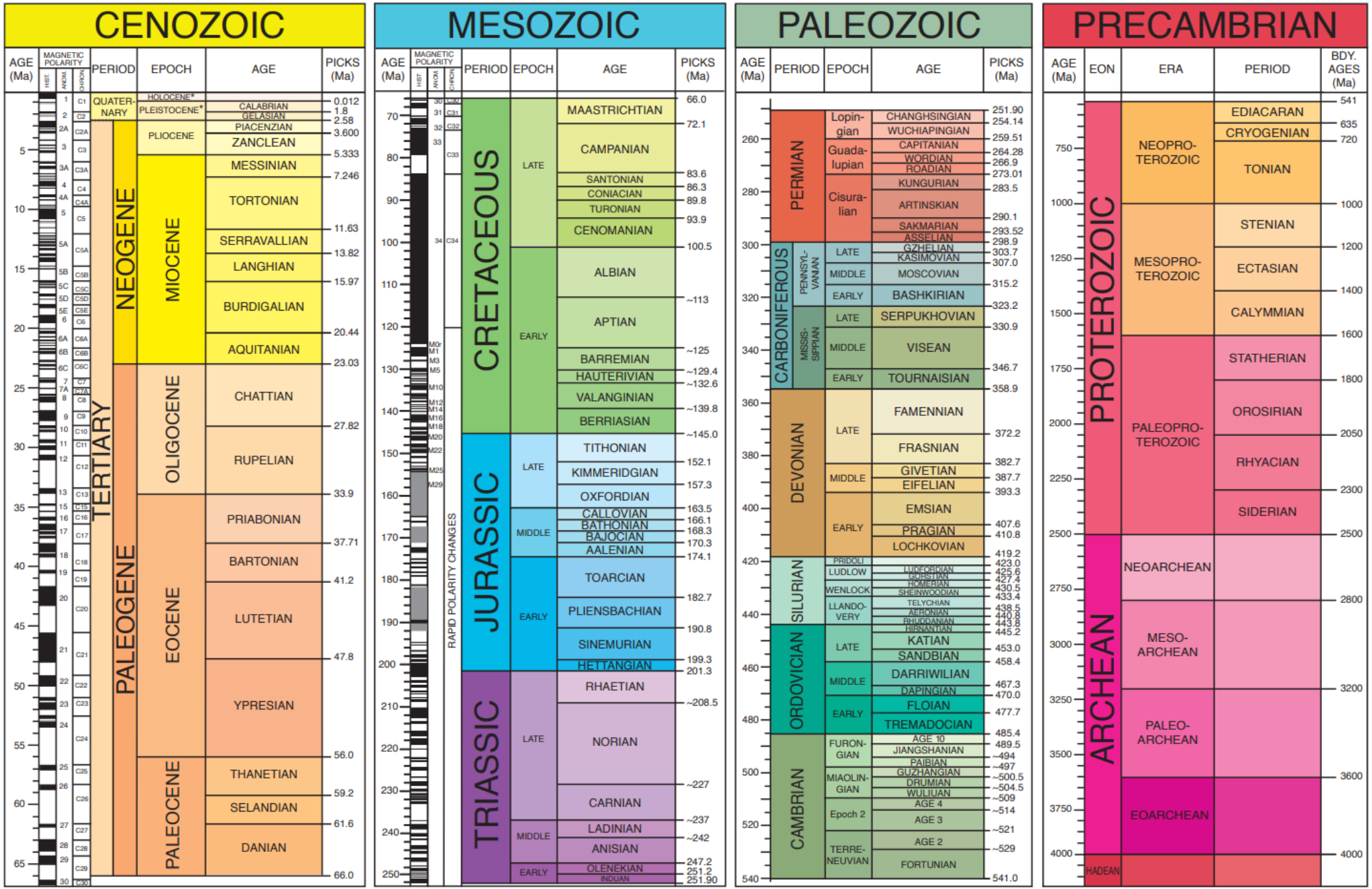
Check DMU Color Ages Tool



A	B	C	D	E	F	G
Map Unit	Age Oldest	Age Youngest	Style Age	Match Status	Distance	Symbol
Qb	Quaternary	Quaternary	Igneous; Volcanic	MATCH	0	0XX0
Ds	Devonian	Devonian	Mississippian	MISMATCH	1	6500
Dm	Devonian	Devonian	Mississippian	MISMATCH	1	2200
EKs	Cretaceous	Cretaceous	Quaternary	MISMATCH	3	0000
LKg	Cretaceous	Cretaceous	Igneous; Volcanic	MATCH	0	0X30
DOg	Devonian	Ordovician	Silurian	MATCH	0	4600
Omg	Ordovician	Ordovician	Cretaceous	MISMATCH	9	63X0
DOx	Devonian	Ordovician	Ordovician	MATCH	0	0420
DOi	Devonian	Ordovician	Permian	MISMATCH	4	6200
DOms	Devonian	Ordovician	Igneous; Volcanic	MISMATCH		0XA0
DOm	Devonian	Ordovician	Permian	MISMATCH	4	2000
DOq	Devonian	Ordovician	Ordovician	MATCH	0	07A0
DOqs	Devonian	Ordovician	Igneous; Volcanic	MISMATCH		0X70
DOsq	Devonian	Ordovician	Cambrian	MISMATCH	1	0750
DOs	Devonian	Ordovician	Cambrian	MISMATCH	1	0AA0
Osg	Ordovician	Ordovician	Jurassic	MISMATCH	8	A020
Oi	Ordovician	Ordovician	Jurassic	MISMATCH	8	6040
DOu	Devonian	Precambrian	Precambrian; Proterozoic; Archean	MATCH	0	2A20
PzPh	Paleozoic	Proterozoic	Precambrian; Proterozoic; Archean	MISMATCH		4770
PzPa	Paleozoic	Proterozoic	Precambrian; Proterozoic; Archean	MISMATCH		3450
--- OVERALL ACCURACY REPORT ---						
Total Units	20					
Matches	6					
Mismatches	14					

Results

1. Percent of map unit record whose age matches
2. How far off mismatched records DMU ages are from FDGC age standard


CENOZOIC
AGE (Ma)
MAGNETIC POLARITY
HIST
ANOM
CHRON
PERIOD
EPOCH
AGE
PICKS (Ma)
QUATER-NARY
NEOGENE
PALEOGENE
TERTIARY
HOLOCENE*
PLEISTOCENE*
PLIOCENE
MIOCENE
OLIGOCENE
EOCENE
PALEOCENE
CALABRIAN
GELASIAN
PIACENZIAN
ZANCLEAN
MESSINIAN
TORTONIAN
SERRAVALLIAN
LANGHIAN
BURDIGALIAN
AQUITANIAN
CHATTIAN
RUPELIAN
PRIABONIAN
BARTONIAN
LUTETIAN
YPRESIAN
THANETIAN
SELANDIAN
DANIAN
0.012
1.8
2.58
3.600
5.333
7.246
11.63
13.82
15.97
20.44
23.03
27.82
33.9
37.71
41.2
47.8
56.0
59.2
61.6
66.0
MESOZOIC
CRETACEOUS
JURASSIC
TRIASSIC
LATE
EARLY
MIDDLE
MAASTRICHTIAN
CAMPANIAN
SANTONIAN
CONIACIAN
TURONIAN
CENOMANIAN
ALBIAN
APTIAN
BARREMIAN
HAUTERIVIAN
VALANGINIAN
BERRIASIAN
TITHONIAN
KIMMERIDGIAN
OXFORDIAN
CALLOVIAN
BATHONIAN
BAJOCIAN
AALENIAN
TOARCIAN
PLIENSBACHIAN
SINEMURIAN
HETTANGIAN
RHAETIAN
NORIAN
CARNIAN
LADINIAN
ANISIAN
OLENEKIAN
INDUAN
RAPID POLARITY CHANGES
66.0
72.1
83.6
86.3
89.8
93.9
100.5
~113
~125
~129.4
~132.6
~139.8
~145.0
152.1
157.3
163.5
166.1
168.3
170.3
174.1
182.7
190.8
199.3
201.3
~208.5
~227
~237
~242
247.2
251.2
251.90
PALEOZOIC
PERMIAN
CARBONIFEROUS
DEVONIAN
SILURIAN
ORDOVICIAN
CAMBRIAN
Lopin-gian
Guada-lupian
Cisura-lian
PENNSYL-VANIAN
MISSIS-SIPPIAN
PRIDOLI
LUDLOW
WENLOCK
LLANDO-VERY
FURON-GIAN
MIAOLIN-GIAN
Epoch 2
TERRE-NEUVIAN
CHANGHSINGIAN
WUCHIAPINGIAN
CAPITANIAN
WORDIAN
ROADIAN
KUNGURIAN
ARTINSKIAN
SAKMARIAN
ASSELIAN
GZHELIAN
KASIMOVIAN
MOSCOVIAN
BASHKIRIAN
SERPUKHOVIAN
VISEAN
TOURNAISIAN
FAMENNIAN
FRASNIAN
GIVETIAN
EIFELIAN
EMSIAN
PRAGIAN
LOCHKOVIAN
LUDFORDIAN
GORSTIAN
HOMERIAN
SHEINWOODIAN
TELYCHIAN
AERONIAN
RHUDDANIAN
HIRNANTIAN
KATIAN
SANDBIAN
DARRIWILIAN
DAPINGIAN
FLOIAN
TREMADOCIAN
AGE 10
JIANGSHANIAN
PAIBIAN
GUZHANGIAN
DRUMIAN
WULIUAN
AGE 4
AGE 3
AGE 2
FORTUNIAN
251.90
254.14
259.51
264.28
266.9
273.01
283.5
290.1
293.52
298.9
303.7
307.0
315.2
323.2
330.9
346.7
358.9
372.2
382.7
387.7
393.3
407.6
410.8
419.2
423.0
425.6
427.4
430.5
433.4
438.5
440.8
443.8
445.2
453.0
458.4
467.3
470.0
477.7
485.4
489.5
~494
~497
~500.5
~504.5
~509
~514
~521
~529
541.0
PRECAMBRIAN
AGE (Ma)
EON
ERA
PERIOD
BDY. AGES (Ma)
PROTEROZOIC
ARCHEAN
HADEAN
NEOPRO-TEROZOIC
MESOPRO-TEROZOIC
PALEOPRO-TEROZOIC
NEOARCHEAN
MESO-ARCHEAN
PALEO-ARCHEAN
EOARCHEAN
EDIACARAN
CRYOGENIAN
TONIAN
STENIAN
ECTASIAN
CALYMMIAN
STATHERIAN
OROSIRIAN
RHYACIAN
SIDERIAN
541
635
720
1000
1200
1400
1600
1800
2050
2300
2500
2800
3200
3600
4000

Standardize DMU Ages

Suggested Colors for Geologic Maps

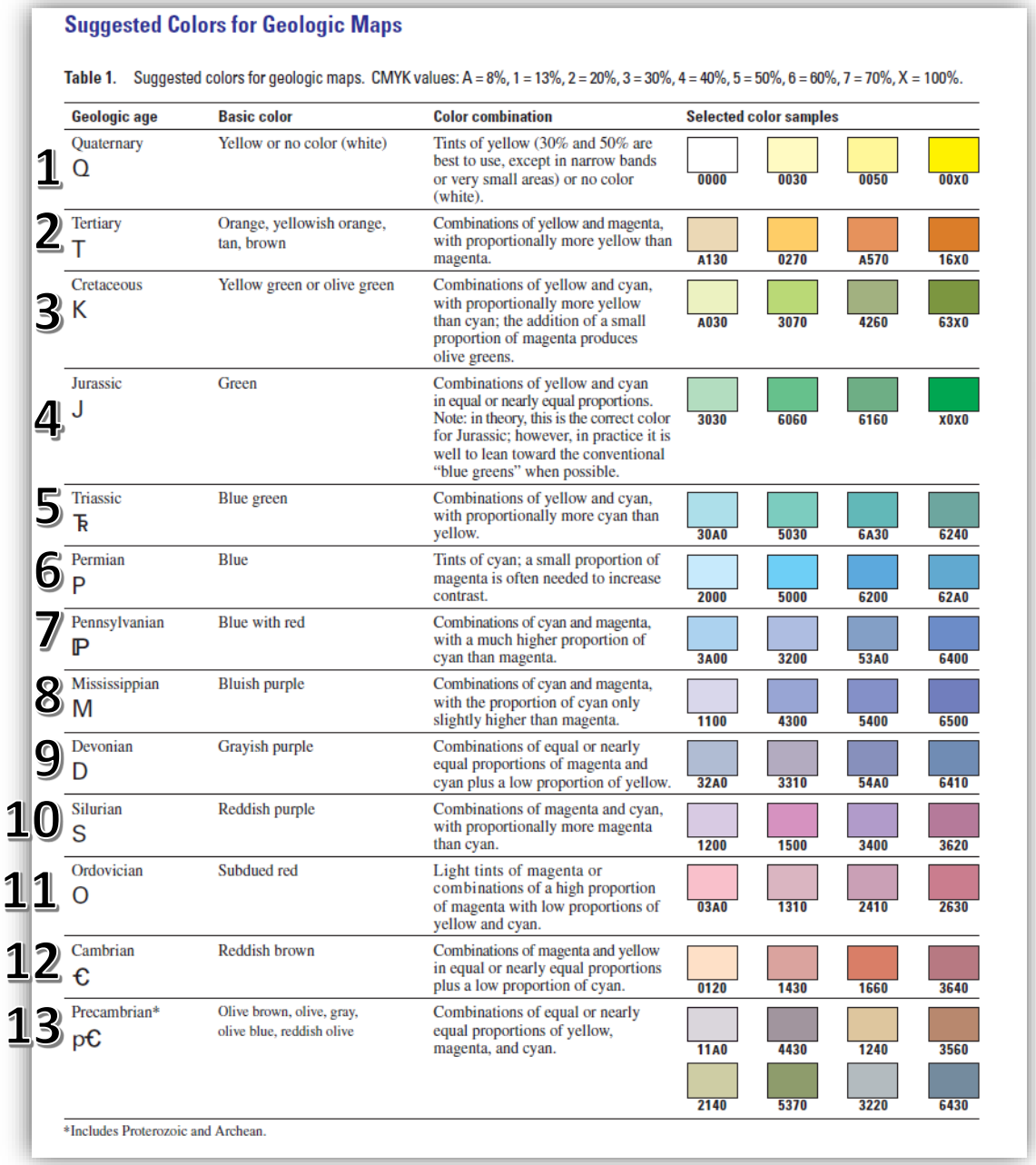
Table 1. Suggested colors for geologic maps. CMYK values: A = 8%, 1 = 13%, 2 = 20%, 3 = 30%, 4 = 40%, 5 = 50%, 6 = 60%, 7 = 70%, X = 100%.

Geologic age	Basic color	Color combination	Selected color samples
Quaternary Q	Yellow or no color (white)	Tints of yellow (30% and 50% are best to use, except in narrow bands or very small areas) or no color (white).	0000 0030 0050 00X0
Tertiary T	Orange, yellowish orange, tan, brown	Combinations of yellow and magenta, with proportionally more yellow than magenta.	A130 0270 A570 16X0
Cretaceous K	Yellow green or olive green	Combinations of yellow and cyan, with proportionally more yellow than cyan; the addition of a small proportion of magenta produces olive greens.	A030 3070 4260 63X0
Jurassic J	Green	Combinations of yellow and cyan in equal or nearly equal proportions. Note: in theory, this is the correct color for Jurassic; however, in practice it is well to lean toward the conventional "blue greens" when possible.	3030 6060 6160 X0X0
Triassic Ŧ	Blue green	Combinations of yellow and cyan, with proportionally more cyan than yellow.	30A0 5030 6A30 6240
Permian P	Blue	Tints of cyan; a small proportion of magenta is often needed to increase contrast.	2000 5000 6200 62A0
Pennsylvanian ₱	Blue with red	Combinations of cyan and magenta, with a much higher proportion of cyan than magenta.	3A00 3200 53A0 6400
Mississippian M	Bluish purple	Combinations of cyan and magenta, with the proportion of cyan only slightly higher than magenta.	1100 4300 5400 6500
Devonian D	Grayish purple	Combinations of equal or nearly equal proportions of magenta and cyan plus a low proportion of yellow.	32A0 3310 54A0 6410
Silurian S	Reddish purple	Combinations of magenta and cyan, with proportionally more magenta than cyan.	1200 1500 3400 3620
Ordovician O	Subdued red	Light tints of magenta or combinations of a high proportion of magenta with low proportions of yellow and cyan.	03A0 1310 2410 2630
Cambrian €	Reddish brown	Combinations of magenta and yellow in equal or nearly equal proportions plus a low proportion of cyan.	0120 1430 1660 3640
Precambrian* p€	Olive brown, olive, gray, olive blue, reddish olive	Combinations of equal or nearly equal proportions of yellow, magenta, and cyan.	11A0 4430 1240 3560 2140 5370 3220 6430

*Includes Proterozoic and Archean.

	map_unit *	symbol	age_label	age_oldest	age_youngest
6	Jdap	0X00	Jurassic	Jurassic	Jurassic
7	pMm	6540	Pre-Mississippian	Pre-Mississippian	Pre-Mississippian
8	Jdfi	0X00	Jurassic	Jurassic	Jurassic
9	Jcp	0X00	Jurassic	Jurassic	Jurassic
10	Tg	04X0	Tertiary	Tertiary	Tertiary
11	pMg	4450	Pre-Mississippian	Pre-Mississippian	Pre-Mississippian
12	pMq	4660	Pre-Mississippian	Pre-Mississippian	Pre-Mississippian
13	pMoq	4760	Pre-Mississippian	Pre-Mississippian	Pre-Mississippian
14	MJdf	0X00	Jurassic or pre-Mississippian	Jurassic or pre-Mississi...	Jurassic or pre-Mississi...
15	JKdl	0X00	Jurassic or younger	Jurassic or younger	Jurassic or younger
16	uPzst	3330	upper Paleozoic	upper Paleozoic	upper Paleozoic
17	uPzv	5550	upper Paleozoic	upper Paleozoic	upper Paleozoic
18	Jdhg	0X00	Jurassic	Jurassic	Jurassic
19	uPzl	6550	upper Paleozoic	upper Paleozoic	upper Paleozoic
20	MDag	3760	Mississippian to Devonian	Devonian	Mississippian
21	Jc	0320	Jurassic	Jurassic	Jurassic
22	MDog	3750	Mississippian to Devonian	Devonian	Mississippian
23	Jt	2X40	Jurassic	Jurassic	Jurassic
24	pMqgs	2240	Pre-Mississippian	Pre-Mississippian	Pre-Mississippian
25	pMaf	2320	Pre-Mississippian	Pre-Mississippian	Pre-Mississippian
26	pMam	4540	Pre-Mississippian	Pre-Mississippian	Pre-Mississippian
27	pMa	3320	Pre-Mississippian	Pre-Mississippian	Pre-Mississippian
28	pMsg	3460	Pre-Mississippian	Pre-Mississippian	Pre-Mississippian
29	uPzmg	6550	upper Paleozoic	upper Paleozoic	upper Paleozoic
30	Jg	0X00	Jurassic?	Jurassic?	Jurassic?
31	TJcp	7XX0	Jurassic to Tertiary?	Jurassic	Tertiary?

- Clean up DMU ages: lower cases, ?s, adjectives
- Map all potential ages to FGDC Ages



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*Includes Proterozoic and Archean.

Symbol: A640

Description of Map Units Symbol Age:
Tertiary

map_unit *	symbol	age_label	age_oldest	age_youngest
Tg	A640	Tertiary	Tertiary	Tertiary

FGDC Standard Symbol Age:
Cambrian

Name	Type	Category
A640	Polygon symbol	Cambrian

= Age Mismatch of 10

CHECK DMU COLOR AGES TOOL

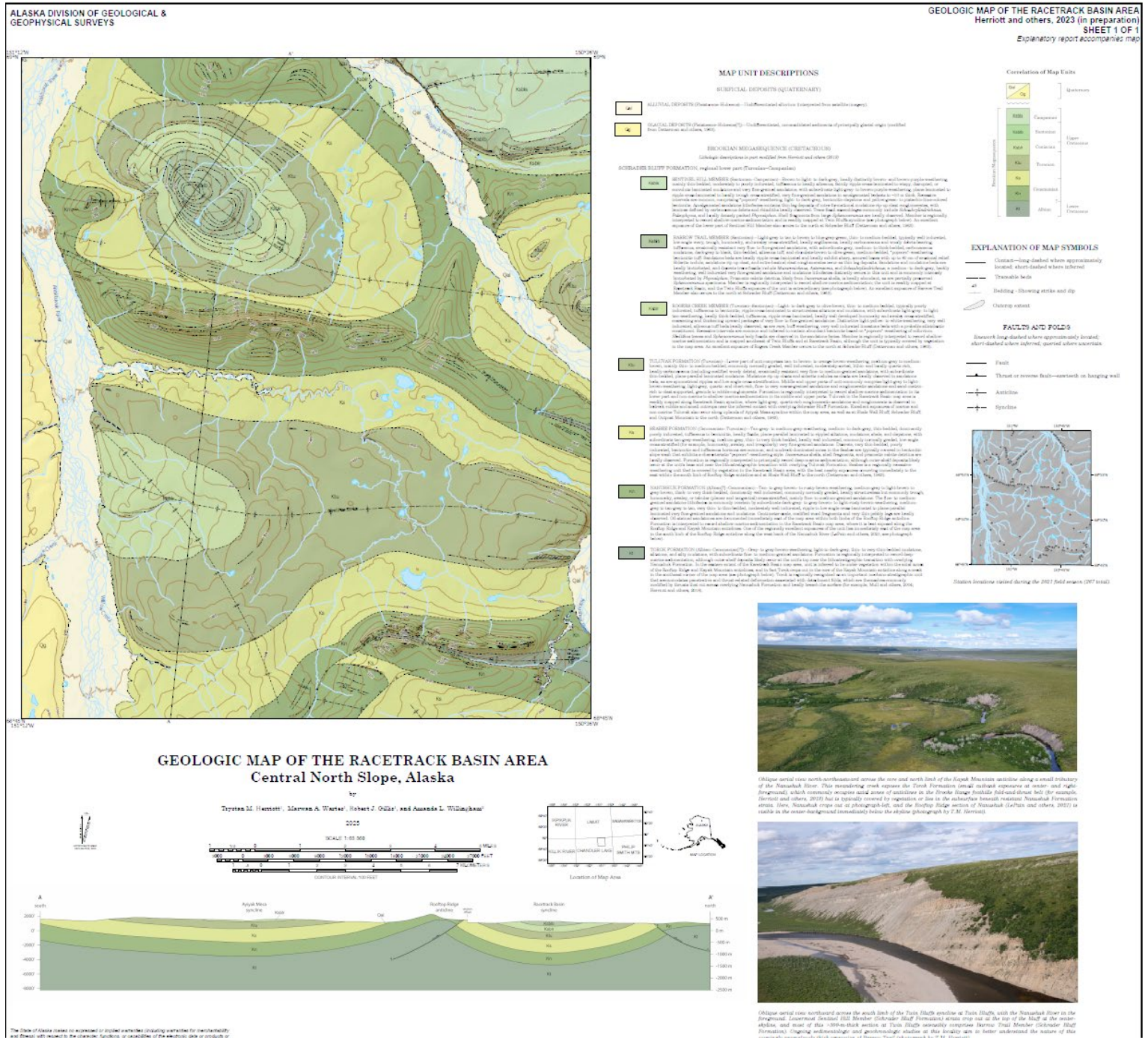
DEMO

Lower Legibility, High Age Accuracy

Color Distance Assessment

- Average Distance **25.9**
- Map Unit Distances
  - **4** Great (>30)
  - **5** Good (>20)
  - **2** Bad (<20)

- **Color Age Assessment**
  - **10/10** Match



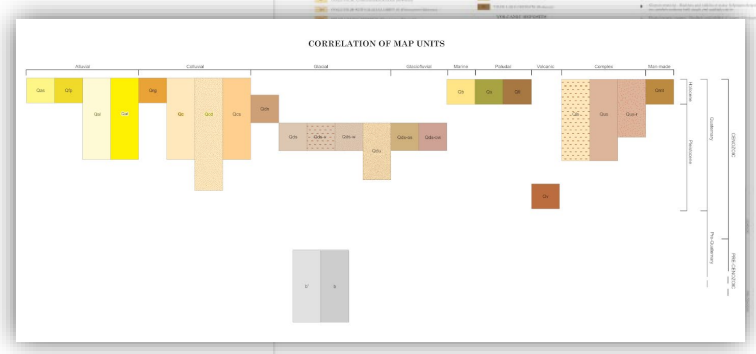
High Legibility, Low Age Accuracy

Color Distance Assessment

- Average Distance= **59.9**
- **24/24** Map Units= Great (>30)

Color Age Assessment

- Map Units with correct age: **5/25**
- Map Units with incorrect age: **20**
  - **9** map units within **3** age categories
  - **11** map units more than **10** categories away



Use of patterns for map units of similar hue

Undifferentiated bedrock as grey

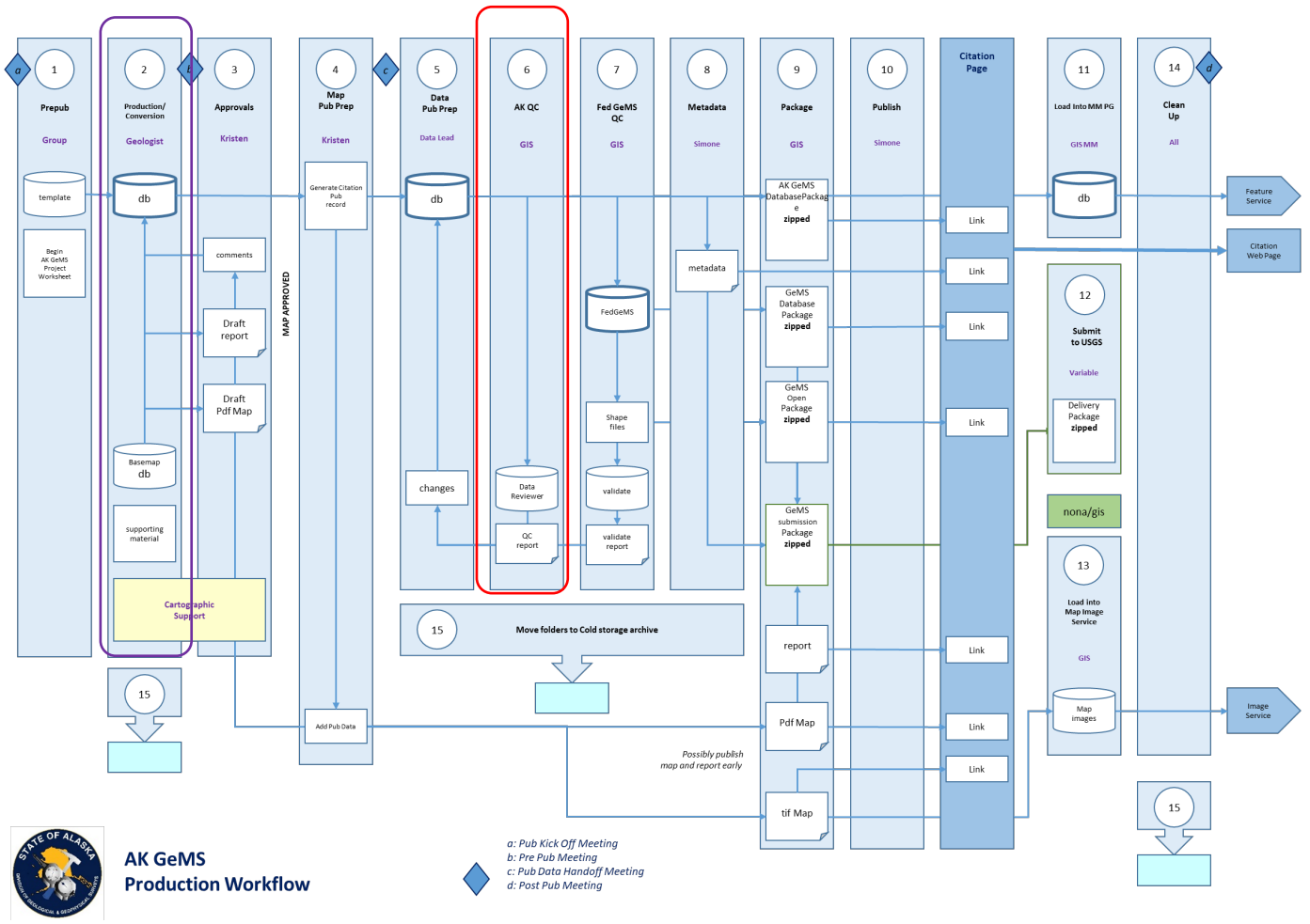
Color Metrics

Phase 2

Aid geologists in database and map production

Phase 6

More robust QC



QUESTIONS

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