Supplementary material: Principal component solutions

1. PCA[A]

1.1. Input correlation matrix of six variables with unity in the principal diagonal. Data set includes the following sample forms: (1) gyrogonite central area, (2) gyrogonite peripheral area, (3) rock matrix and (4) $CaCO_3$.

	O	Mg	Al	Si	K	Ca
O	1	0.011162	-0.210648	-0.205879	-0.176352	-0.204582
Mg	0.011162	1	0.609875	0.337409	0.868223	-0.428874
Al	-0.210648	0.609875	1	0.662365	0.630925	-0.674027
Si	-0.205879	0.337409	0.662365	1	0.504443	-0.900519
K	-0.176352	0.868223	0.630925	0.504443	1	-0.513094
Ca	-0.204582	-0.428874	-0.674027	-0.900519	-0.513094	1

1.2. Solution of PCA[A]

Variable	Component 1	Component 2	Component 3	Component 4	Component 5	Component 6	
O	0.130671	-0.940707	-0.305366	0.054789	0.037362	0.018700	1
Mg	-0.770338	0.067373	-0.601033	-0.013771	-0.201503	-0.002703	1
Al	-0.868703	0.106672	0.081570	0.473622	0.054279	0.007721	1
Si	-0.827924	-0.077116	0.518173	-0.184645	-0.068573	0.036002	1
K	-0.845765	0.195219	-0.400186	-0.216991	0.198284	0.004588	1
Ca	0.838097	0.439988	-0.312245	0.068337	-0.002418	0.042798	1
Eigenvalue	3.46832	1.13849	0.98729	0.31336	0.08897	0.00357	6
Cumulative explained variance %	57.8053	76.7802	93.2351	98.4577	99.9406	100	

1.3. Acceptable two-component solution of PCA[A]

Variable	Component 1	Component 2	Variance *
O	0.130671	-0.940707	90.20
Mg	-0.770338	0.067373	59.80
Al	-0.868703	0.106672	76.60
Si	-0.827924	-0.077116	69.14
K	-0.845765	0.195219	75.34
Ca	0.838097	0.439988	89.60
Eigenvalue	3.46832	1.13849	4.60681
Cumulative explained variance %	57.8053	76.7802	

* Variance explained by first 2 PC (%)

2. PCA[B]

2.1. Input correlation matrix of four variables with unity in the principal diagonal. Data set includes the following sample forms: (1) gyrogonite central area, (2) gyrogonite peripheral area and (3) $CaCO_3$.

	O	Mg	Si	Ca
O	1	0.099971	0.203281	-0.969949
Mg	0.099971	1	0.092820	-0.098550
Si	0.203281	0.092820	1	-0.208286
Ca	-0.969949	-0.098550	-0.208286	1

2.2. Solution of PCA[B]

Variable	Component 1	Component 2	Component 3	Component 4	
O	0.968494	0.185997	0.111452	0.122486	1
Mg	0.212665	-0.854112	0.474622	-0.000232	1
Si	0.389504	-0.456278	-0.800060	0.000680	1
Ca	-0.969300	-0.184901	-0.106005	0.122607	1
Eigenvalue	2.07446	1.00648	0.88902	0.03004	4
Cumulative explained variance %	51.8616	77.0236	99.2491	100	

2.3. Acceptable two-component solution of PCA[B]

Variable	Component 1	Component 2	Variance *
O	0.968494	0.185997	97.26
Mg	0.212665	-0.854112	77.47
Si	0.389504	-0.456278	35.99
Ca	-0.969300	-0.184901	97.37
Eigenvalue	2.07446	1.00648	3.08094
Cumulative explained variance %	51.8616	77.0236	

* Variance explained by first 2 PC (%)