Supplementary Materials

Overland flow fabric and structures generated in laboratory experiments – fluids composed of low concentrations (≈ 3 vol %) of soil aggregates

Figure A.1. Steep-planar hillslopes. These are very common in the transition between steep hillslopes and alluvial terraces (a) and hollows of the valley head (b) within the Paraná Basin Volcanic Plateau.

Table A.1. Description of Laminae.

		External Organization[a]		Internal organization		
Laminae	Avg. thickness (mm)	Bedding surface	Lateral extents	Composition and texture[a]	Selection[b]	Fabric
Proximal sector						
Parallel-flow						
thin section 15/55						
V	0.43	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – soil aggregates very fine to very coarse sand > quartz/arcosian fine to medium sand	Poorly sorted	Inverse discontinuous gradation to massive
IV	1.52	Wavy, nonparallel	Convergence and intersection of bedding surface	Mix – quartz/arcosian fine to medium sand > soil aggregates very fine to medium sand	Well sorted	Diffuse- folded microlaminated
III	0.69	Discontinuous, even, parallel	Convergence and intersection of bedding surface	Mix – quartz/arcosian fine to medium sand > soil aggregates fine to medium sand	Well sorted	Diffuse- folded microlaminated
II	1.88	Even, parallel	Convergence and intersection of bedding surface	Mix – quartz/arcosian fine to medium sand > soil aggregates very fine to medium sand	Well sorted	Diffuse- folded microlaminated
I	0.69	Discontinuous, wavy, parallel	Abutting against an unconformity	Mix – quartz/arcosian fine to medium sand > soil aggregates very fine to coarse sand	Poorly sorted	Diffuse- folded microlaminated to massive
thin section 25/45						
III	0.65	Wavy, parallel	Convergence and intersection of bedding surface	Mix -soil aggregates fine sand to granule > quartz/arcosian fine to coarse sand	Poorly sorted	Inverse discontinuous gradation
II	1.91	Wavy, parallel	Convergence and intersection of bedding surface	Mix – quartz/arcosian fine to coarse sand > soil aggregates fine to coarse sand	Moderately well sorted	Diffuse- folded microlaminated

I	1.10	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – quartz/arcosian medium to coarse sand > soil aggregates fine to medium sand	Moderately well sorted	Diffuse- folded microlaminated
Oblique-flow						
thin section 10/45						
VI	0.60	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – quartz/arcosian fine to medium sand > soil aggregates medium to very coarse sand and granule	Very poorly sorted	Inverse discontinuous gradation
V	0.80	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – quartz/arcosian fine to medium sand > soil aggregates fine to very coarse sand	Very poorly sorted	Inverse discontinuous gradation
IV	0.40	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – quartz/arcosian fine to medium sand > soil aggregates fine sand	Very well sorted	Massive
III	0.70	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – soil aggregates fine to coarse sand > quartz/arcosian fine to medium sand	Poorly sorted	Inverse discontinuous gradation to massive
II	2.00	Wavy, parallel	convergence and intersection of bedding surface	Mix – quartz/arcosian fine to medium sand > soil aggregates fine to medium sand	Well sorted	Diffuse-microlaminated to massive
I	1.75	Discontinuous, wavy, parallel	Convergence and intersection of bedding surface	Mix – quartz/arcosian fine to medium sand > soil aggregates fine to coarse sand	Moderately well sorted	Diffuse-folded microlaminated
thin section 15/55						
VI	0.60	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – quartz/arcosian fine to medium sand > soil aggregates fine	Very poorly sorted	Inverse discontinuous gradation

				to very coarse sand and granule		
V	0.75	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – soil aggregates fine to very coarse sand > quartz/arcosian fine to medium sand	Poorly sorted	Inverse discontinuous gradation
IV	0.80	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – quartz/arcosian fine to medium sand > soil aggregates fine to medium sand	Well sorted	Massive
III	0.70	Wavy, parallel	Convergence and intersection of bedding surface	Mix – soil aggregates fine to coarse sand > quartz/arcosian fine to medium sand	Poorly sorted	Diffuse- folded microlaminated to massive
II	1.30	Wavy, parallel	Convergence and intersection of bedding surface	Mix – quartz/arcosian fine to coarse sand > soil aggregates very fine to fine sand	Moderately well sorted	Diffuse- folded microlaminated to massive
I	1.40	Wavy, parallel	Convergence and intersection of bedding surface	Mix – quartz/arcosian fine to medium sand > soil aggregates fine to medium sand	Well sorted	Diffuse- folded microlaminated
thin section 20/45						
VI	1.20	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – soil aggregates fine to coarse sand and granule > quartz/arcosian fine to medium sand	Very poorly sorted	Inverse discontinuous gradation
V	1.25	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix - quartz/arcosian medium to coarse sand > soil aggregates fine to medium sand	Moderately well sorted	Diffuse-cross-microlaminated (increscent angle 25-45^{o})
IV	0.70	Discontinuous, wavy, nonparallel	Lateral gradation-bedding surfaces become indistinguishabl	Mix - quartz/arcosian medium to coarse sand sand > soil aggregates very fine	Well sorted	Diffuse-cross-microlaminated (increscent angle 30-40^{o})

			e	to fine sand		
III	1.26	Discontinuous, wavy, nonparallel	Lateral gradation-bedding surfaces become indistinguishable	Mix - quartz/arcosian fine to medium sand sand > soil aggregates very fine to fine sand	Well sorted	Diffuse-cross-microlaminated (increscent angle 10-25^{o})
II	1.10	Discontinuous, wavy, nonparallel	Lateral gradation-bedding surfaces become indistinguishable	Mix - quartz/arcosian fine to medium sand sand > soil aggregates very fine to fine sand	Well sorted	Diffuse-cross-microlaminated (increscent angle 25-35^{o})
I	0.50	Discontinuous, wavy, parallel	Convergence and intersection of bedding surface	Mix -soil aggregates fine to medium sand > quartz/arcosian fine to medium sand	Well sorted	Massive
thin section 25/45						
VI	1.00	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – soil aggregates medium to very coarse sand > quartz/arcosian medium to coarse sand	Moderately well sorted	Inverse discontinuous gradation
V	1.10	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix - quartz/arcosian medium to coarse sand > soil aggregates medium to coarse sand	Moderately well sorted	Diffuse-cross-microlaminated (increscent angle 25-52^{o})
IV	1.40	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix - quartz/arcosian fine to coarse sand > soil aggregates fine to medium sand	Moderately well sorted	Diffuse-cross-microlaminated (increscent angle 20-40^{o})
III	1.60	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – soil aggregates fine sand to granule > quartz/arcosian medium to coarse sand	Poorly sorted	Normal discontinuous gradation
II	2.30	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix - quartz/arcosian fine to medium sand >	Moderately well sorted	Diffuse-cross-microlaminated (increscent angle

				soil aggregates fine to medium sand		20-40°)
I	0.35	Discontinuous, wavy, nonparallel	Convergent and intersection of bedding surface	Mix -soil aggregates mud and fine sand > quartz/arcosian fine to medium sand	Well sorted	Massive
Median sector						
Parallel-flow						
thin section 30/45						
III	1.40	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix - soil aggregates fine to granule sand > quartz/arcosian fine to medium sand	Poorly sorted	Diffuse-cross-microlaminated (increscent angle 5-45°)
II	0.80	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix - quartz/arcosian fine to coarse sand > soil aggregates fine to very coarse sand	Moderately well sorted	Diffuse-cross-microlaminated (increscent angle 5 to 25°)
I	0.72	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix - quartz/arcosian fine to coarse sand > soil aggregates fine to very coarse sand	Moderately well sorted	Normal discontinuous gradation
thin section 40/55						
II	2.04	Even, parallel	Convergence and intersection of bedding surface	Mix – quartz/arcosian fine to coarse sand > soil aggregates fine to coarse sand	Moderately well sorted	Diffuse- folded microlaminated
I	0.54	Even, parallel	Convergence and intersection of bedding surface	Mix – quartz/arcosian fine to medium sand > soil aggregates very fine to medium sand	Well sorted	Massive
Oblique-flow						
thin section 30/45						
II	1.16	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – soil aggregates fine to very coarse sand > quartz/arcosian fine to medium	Poorly sorted	Inverse discontinuous gradation
I	0.77	Discontinuous, wavy, nonparallel	Abutting against an unconformity	Mix – quartz/arcosian fine to medium > soil	Moderately well sorted	Diffuse-microlaminated to massive

				aggregates fine to coarse sand		
thin section 40/55						
IV	0.33	Discontinuous, wavy, parallel	Abutting against an unconformity	Mix - quartz/arcosian fine to medium sand > soil aggregates fine to coarse sand	Poorly sorted	Inverse discontinuous gradation to massive
III	0.94	Wavy, parallel	Convergence and intersection of bedding surface	Mix - quartz/arcosian fine to medium sand > soil aggregates fine to medium sand	Moderately well sorted	Diffuse-microlaminated to massive
II	0.25	Discontinuous, wavy, parallel	Abutting against an unconformity	Mix – quartz/arcosian very fine to fine sand > soil aggregates very fine to fine sand	Well sorted	Massive
I	0.26	Discontinuous, wavy, parallel	Abutting against an unconformity	Mix – quartz/arcosian very fine to fine sand > soil aggregates very fine to fine sand	Well sorted	Massive
Distal sector						
Parallel-flow						
thin section 65/55						
II	0.40	Discontinuous, even, parallel	Abutting against an unconformity	Mix – quartz/arcosian fine to medium sand > soil aggregates fine to medium sand	Well sorted	Massive
I	0.86	Even, parallel	Convergence and intersection of bedding surface	Mix – quartz/arcosian fine to medium sand > soil aggregates very fine to medium sand	Well sorted	Massive
thin section 80/45						
II	0.91	Discontinuous, wavy, nonparallel	Convergence and intersection of bedding surface	Mix – soil aggregates coarse sand to granule > quartz/arcosian medium to coarse sand	Poorly sorted	Inverse discontinuous gradation
I	0.37	Discontinuous	Convergence	Mix –	Moderatel	Massive

		, wavy, parallel	and intersection of bedding surface	quartz/arcosian medium to coarse sand > soil aggregates fine to medium sand	y well sorted	
Oblique-flow						
thin section 65/55						
III	0.32	Discontinuous , wavy, parallel	Abutting against an unconformity	Mix – soil aggregates medium to coarse sand > quartz/arcosian fine to medium sand	Poorly sorted	Inverse discontinuous gradation
II	0.50	Discontinuous , wavy, parallel	Convergence and intersection of bedding surface	Mix – quartz/arcosian fine to medium sand > soil aggregates very fine to medium sand	Well sorted	Massive
I	0.80	Discontinuous , wavy, nonparallel	Abutting against an unconformity	Mix – quartz/arcosian fine to medium sand > soil aggregates very fine to medium sand	Well sorted	Diffuse-microlaminated to massive
thin section 80/45						
II	0.78	Wavy, parallel	Abutting against an unconformity	Mix – soil aggregates medium sand to granule > quartz/arcosian medium sand	Poorly sorted	Inverse discontinuous gradation
I	0.38	Discontinuous , wavy, parallel	Abutting against an unconformity	Mix – quartz/arcosian fine to medium sand > soil aggregates fine to medium sand	Well sorted	Massive

*based on Campbell (1967)[a] and Harrel (1983)[b].

Campbell, C.V. (1967). Lamina, laminaset, bed and bedset. Sedimentol. 8, 7-36.
Harrell, J. 1983. A visual comparator for degree of sorting in thin and plane sections. J. Sedimentol. Research. 54, 646-650. https://doi.org/10.2110/jsr.54.646