

Table S1: Sampled sub-basin topographic, climatic and geologic attributes^a

Sub-basin	Drainage area (km ²)	Elevation zone (Figure 1)	Minimum elevation (m ASL)	Maximum elevation (m ASL)	Mean elevation (m ASL)	Mean slope (degrees)	Mean snow probability	Average July (dry season) precipitation (mm)	Average March (wet season) precipitation (mm)	Average annual precipitation (mm)	Dominant geologies ^{b,c,d}
Headwaters	6160	Alpine	2204	6418	4032	18.5	5%	10	143	750	Precambrian basement (Maranon complex)
											Early Cretaceous continental deposits
											Early-Late Cretaceous marine deposits
Putchka	2673	Alpine	2126	6258	3994	22.9	5%	6	138	783	Late Jurassic marine deposits (Chicama)
											Early Cretaceous continental deposits
											Early-Late Cretaceous marine deposits
Yanomayo	2168	Alpine	1974	6243	3846	22.3	11%	5	132	748	Early Cretaceous continental deposits
											Early-Late Cretaceous marine deposits
											Late Jurassic marine deposits (Chicama)
Rupac	926	Alpine	1764	4584	3498	21.3	0%	7	116	665	Early Cretaceous continental deposits
											Late Triassic-Early Jurassic marine deposits (Pucara)
											Late Jurassic marine deposits (Chicama)
Actuy	438	Alpine	1668	4672	3638	21.9	0%	10	139	798	Early Carboniferous continental deposits
											Precambrian basement (Maranon complex)
											Early Carboniferous continental deposits
Cajas	719	Alpine	1595	4696	3545	23.1	8%	15	146	901	Early Paleozoic granodiorite/granite
											Precambrian basement (Maranon complex)
											Early Carboniferous continental deposits
San Miguel	455	Transition	1302	4579	3386	26.3	15%	19	162	997	Late Triassic-Early Jurassic marine deposits (Pucara)
											Late Jurassic marine deposits (Chicama)
											Early Cretaceous continental deposits
Chusgon	1267	Transition	1083	4667	3206	21.1	0%	17	167	982	Early-Late Cretaceous marine deposits
											Late Jurassic marine deposits (Chicama)
											Early Cretaceous continental deposits
Crisnejas	4693	Transition	1002	4702	3118	15.7	0%	16	160	939	Early-Late Cretaceous marine deposits
											Early Cretaceous continental deposits
											Early-Late Cretaceous marine deposits
Yangas	1188	Transition	768	4250	2993	18.8	1%	28	154	1022	Early Cretaceous continental deposits
											Early-Late Cretaceous marine deposits
											Precambrian basement (Maranon complex)
Shauve	110	Transition	737	3811	2213	25.6	8%	28	119	819	Neogene Quaternary continental deposits
											Early Cretaceous continental deposits
											Early-Late Cretaceous marine deposits
Silaco	2433	Transition	520	4232	2800	17.8	2%	30	141	978	Early-Late Cretaceous marine deposits
											Late Jurassic marine deposits (Chicama)
											Late Triassic-Early Jurassic marine deposits (Pucara)
Chamaya	7730	Jungle	425	4049	2202	21.1	7%	28	138	811	Early Cretaceous continental deposits
											Late Jurassic marine deposits (Chicama)
											Late Triassic-Early Jurassic marine deposits (Pucara)
Chinchi	7812	Jungle	353	3934	1692	20.1	20%	63	165	1199	Neogene Quaternary continental deposits
											Neogene Pliocene volcanics
											Precambrian basement (Maranon complex)
											Early Cretaceous continental deposits
											Early-Late Cretaceous marine deposits
											Early-Late Cretaceous marine deposits

^aGeology classifications derived from 1:100,000 scale Peruvian Geology map (INGEMMET, 1999).

^bContinental deposits generally refer to clastic sediments (sandstones, river conglomerate facies, soils).

^cMarine sediments typical include limestones and calcium carbonate sedimentary formations, with some clastics.

^dThe Maranon complex is highly metamorphosed at deep levels and thus can be highly crystalline.