minerals

MDPI

SUPPLEMENTARY MATERIAL—TABLE CAPTIONS

Table S1. Information on sampling sites.

Table S2. Bulk-sample and multiple-window petrographic data on sediment samples from the Bengal delta, estuary, and shelf. Q = quartz (Qp = polycrystalline); F = feldspars (K = K-feldspar; P = plagioclase); L= aphanitic lithic grains (Lv = volcanic and subvolcanic; Lvf = felsic volcanic; Lvm = mafic and intermediate volcanic; Ls = sedimentary; Lcc = limestone; Lcd = dolostone; Lh = chert; Lp = pelite; Lm = metamorphic; Lms = low-rank metasedimentary; Lmv = low-rank metavolcanic; Lmf = high-rank metapelite, metapsammite, and metafelsite; Lmb = high-rank metabasite; Lu = ultramafic). Rock fragments: I = plutonic (Im = mafic plutonic); V = volcanic (Vm = mafic volcanic); C = carbonate (Cd = dolostone); M = metamorphic (Mb = metabasite); S = ultramafic (Sc = cellular serpentinite); n.d. = not determined. The Metamorphic Indices MI and MI* express the average metamorphic rank of rock fragments in each sample. MI varies from 0 (detritus shed by exclusively sedimentary and volcanic cover rocks) to 500 (very-high-rank detritus shed by exclusively high-grade basement rocks). MI* considers only metamorphic rock fragments, and thus varies from 100 (very-low-rank detritus shed by exclusively very low-grade metamorphic rocks) to 500 ([3]).

Table S3. Bulk-sample and multiple-window heavy-mineral data on sediment samples from the Bengal delta, estuary, and shelf. GSZ = grain size; HMC= heavy mineral concentration; tHMC= transparent heavy mineral concentration; n.d. = not determined. The ZTR index (sum of zircon, tourmaline and rutile over total transparent heavy minerals; [5]) evaluates the 'chemical durability' of the detrital assemblage. The HCI (Hornblende Colour Index) and MMI (Metasedimentary Minerals Index) vary from 0 in detritus from greenschist-facies to lowermost amphibolite-facies rocks yielding blue-green amphibole and chloritoid, to 100 in detritus from granulite-facies rocks yielding brown hornblende and sillimanite, and are used to estimate the average metamorphic grade of metaigneous and metasedimentary source rocks, respectively. The SI (Sillimanite Index) index varies from 0 in detritus from upper amphibolite-facies metasediments yielding fibrolitic sillimanite to 100 in detritus from granulite-facies metasediments yielding prismatic sillimanite ([4]; [1]).

Table S4. Bulk-sample and multiple-window chemical data on sediment samples from the Bengal estuary and shelf. Major and trace element concentrations mostly measured at CRPG-Nancy by ICP-AES and ICP-MS after alkaline fusion with lithium metaborate followed by acid digestion (for full information on analytical procedures and geostandards used see [2]). Analytical uncertainties for major and trace elements are indicated in the tables below.
The 63-2000 μm fraction of Padma sample S3562 (representing 99.6% of the bulk sample) and three subclasses split by sieving at 0.50 Φ intervals were analysed at Bureau Veritas (ACME Lab, Vancouver, Canada) following a lithium metaborate/tetraborate fusion and nitric acid digestion; major oxides and several minor elements were determined by ICP-ES and trace elements by ICP-MS (for further information on adopted procedures, geostandards used, and precision for various elements of group 4A–4B see http://acmelab.com).
REE data were normalized to CI carbonaceous chondrites ([6]). Weathering indices were calculated using molecular proportions and correcting for CaO in apatite. Increasing alteration is indicated by increasing CIA (Chemical Index of Alteration; [7]) and by decreasing WIP (Weathering Index; [8]).

Table S5. Analytical uncertainties. ** Uncertainty, calculated for 200 mg of prepared sample, becomes important (>25%) for concentrations between the detection limit and the weakest concentration for which the error percentage is indicated.

	ICP-OES iCap6500	SiO_2	Al_2O_3	Fe_2O3	MnO	MgO	CaO	Na_2O	K_2O	TiO_2	$P2O_5$
Uncertainty (%) as a function of concentration	>10%	<2%	<2%	<2%			<2%				
	>5%		<10%			<2%	<5%	<5%	<5%	<5%	
	>1%		<15%	<10%	<5%	<10%		<10%	<10%	<10%	<5%
	>0.5%	<10%		<15%	<15%	<15%	<15%	<15%	<20%	<20%	<15%
	>0.1%	<20%	<20%								**
	>0.05%	**	**	<20%	<20%	<20%	<25%	<25%	<25%	<25%	
	>0.01%			**	**	**	**	**	**	**	
Detection limit	D.L%	0.05	0.04	0.015	0.015	0.03	0.03	0.02	0.03	0.02	0.10

ICPMS iCapQ & ICP-OES (iCap6500 for Sc)	As	Ba	Be	Bi	Cd	Co	Cr	Cs	Cu	Ga	Ge	Hf	In	Mo	Nb	Ni	Pb	Rb	Sb	Sc	Sn	Sr
>100 µg/g																				<5%		
>50 µg/g	<5%	<5%	<5%		<10%	<5%			<8%		<5%		<5%	<5%	<5%		<10%	<5%		<10%	<5%	<5%
>10 µg/g	<15%	<15%	<15%	<5%	<15%	<10%	<5%	<5%	<20%	<5%		<5%		<15%		<5%		<15%	<5%		<15%	<10%
>1 µg/g	<20%	**		<10%		<20%	<10%	<15%	**	<10%	<10%	<10%	<15%	<20%	<10%	**	<20%	<20%	<10%	<15%	<20%	<20%
>0.5 µg/g																				**		
>0.1 µg/g	**		<20%	<20%	<20%	**	**	<20%		<20%	<20%	<15%	<20%	**	<20%		**	**	<20%		**	**
>0.01 µg/g			**	**	**			**		**	**	**	**		**				**			
D.L. µg/g	0.50	5.5	0.05	0.045	0.02	0.08	0.50	0.02	2.0	0.02	0.04	0.03	0.03	0.50	0.015	2.0	0.45	0.15	0.06	0.6	0.30	0.70
	Ta	**Th**	**U**	**V**	**W**	**Y**	**Zn**	**Zr**	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Ho**	**Er**	**Tm**	**Yb**	**Lu**
>100 µg/g																						
>50 µg/g	<5%	<5%	<5%	<5%	<5%	<5%	<10%	<5%		<5%	<5%	<5%				<5%		<5%		<5%	<5%	
>10 µg/g			<10%	<10%	<10%		<20%	<15%	<5%	<10%	<10%	<15%	<5%		<5%	<10%	<5%				<10%	<5%
>1 µg/g	<10%	<10%	<15%	<15%	<20%	<15%	**	**	<15%	<15%			<15%	<5%	<10%	<15%	<10%	<10%	<5%	<10%	<15%	<10%
>0.5 µg/g																						
>0.1 µg/g	<20%	<20%	<20%	**	**	<20%			<20%	<20%	<20%	<20%	<20%	<10%	<20%	<20%	<15%	<20%	<10%	<20%	<20%	<20%
>0.01 µg/g	**	**	**			**			**	**	**	**	**	**	**	**	**	**	**	**	**	**
D.L. µg/g	0.004	0.015	0.01	0.85	0.80	0.02	7.0	1.50	0.02	0.03	0.004	0.016	0.005	0.002	0.005	0.001	0.004	0.001	0.002	0.001	0.002	0.001

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