

Table S1. Rock type abundance results for all scenarios calculated. No-solution pixels and maria pixels (defined by all nearside pixels with greater than 15 wt% FeO according to the LP GRS (Prettyman et al. 2006)) are excluded from the mean rock type abundances.

	Description	Mean norite (vol%)	Mean gabbro (vol%)	Mean troctolite (vol%)	Mean dunite (vol%)	Mean pyrox. (vol%)	Mean mare basalt (vol%)	Mean anorth. (vol%)	Mantle Material (vol%)	Total non- MO rocks (vol%)	% area no solution	% area with solution but less than mantle limit
Mafics into POI and/or mare basalt	Pure anorthite; all mafics POI	10.53	21.99	12.61				54.87	0.00	45.13	0.00	n/a
	PAN; excess mafics POI	10.43	22.41	11.47				55.69	0.00	44.31	6.87	n/a
	Anorthosites with 7 vol% mafics; excess mafics POI	8.86	22.34	8.42				60.39	0.00	39.61	18.52	n/a
	PAN; excess ol + opx POI; excess cpx mare basalt	10.40		11.41			19.43	58.77	0.00	41.23	6.94	n/a
	Mafic anorthosites (15 vol%); excess ol + opx POI; excess cpx mare basalt	5.79		6.21			21.30	66.71	0.00	33.29	72.40	n/a

Mafics into mantle and/or mare basalt	Pure anorthite; all mafics mantle				5.93	18.34		75.73	24.27	24.27	0.00	n/a
	PAN; excess mafics mantle				5.18	18.31		75.50	23.50	23.50	7.17	n/a
	Mafic anorthosites (15 vol%); excess mafics mantle				2.45	12.54		85.02	14.98	14.98	73.18	n/a
	Mafic anorthosites (15 vol%); excess ol+opx mantle; excess cpx mare bas.				2.51	2.56	20.77	74.17	5.06	25.83	75.35	n/a
Mafics into mantle up to 40%	PAN; mafics to mantle up to 40%; excess ol + opx POI; excess cpx mare basalt	0.04		0.05	5.25	17.82	0.30	76.54	23.07	23.46	51.12	82.85
	Mafic anorthosites (15 vol%); mafics into mantle up to 40%; excess ol + opx POI; excess cpx mare basalt	0.00		0.00	2.47	12.35	0.00	85.18	14.82	14.82	80.48	93.94

Mafics into mantle up to 30%	PAN; mafics into mantle up to 30%; excess ol + opx POI; excess cpx mare basalt	0.49		0.43	5.29	16.61	2.16	75.02	21.90	24.98	51.71	62.92
	Mafic anorthosites (15 vol%); mafics into mantle up to 30%; excess ol + opx POI; excess cpx mare basalt	0.01		0.03	2.47	10.78	0.17	86.54	13.25	13.46	81.87	73.95
Mafics into mantle up to 20%	PAN; mafics to mantle up to 20%; excess ol + opx POI, excess cpx mare basalt	2.53		2.13	4.55	13.93	7.12	69.75	18.47	30.25	36.39	42.10
	Mafic anorthosites (15 vol%); mafics into mantle up to 20%; excess ol + opx POI; excess cpx mare basalt	4.38		4.52	2.59	13.42	10.33	70.92	16.00	35.24	66.25	44.89

	PAN; ol + opx to mantle up to 20%; excess ol + opx into POI; all cpx to mare basalt	0.09		0.19	5.14	5.19	19.39	69.99	10.34	30.01	7.63	96.40
Mafics into mantle up to 2%	PAN; mafics to mantle up to 2%; excess ol + opx POI, excess cpx mare basalt	9.50		10.28	0.52	1.48	18.01	60.22	2.00	39.78	7.59	10.23
	Mafic anorthosites (15 vol%); mafics into mantle up to 2%; excess ol + opx POI; excess cpx mare basalt	5.17		5.73	0.59	1.40	20.84	66.26	1.99	33.74	78.40	10.50
	PAN; ol + opx to mantle up to 2%; excess ol + opx into POI; all cpx to mare basalt	8.52		9.25	1.01	0.99	19.50	60.73	2.00	39.27	8.18	5.86