SUPPLEMENTARY MATERIAL

The three tables of data correspond to the three data sets represented in Table 1 of the paper. First is the count of all traxa against current time bins, then a version using these data but combined into stage-level time bins, and thirdly a version with 'Olson's Gap' introduced. Note that 'Amphibia' is used here as shorthand for the non-amniote tetrapods.

Table S1: Regular dating

			'Amphibia'			Amniota			Tetrapoda					
		My	**O**	**E**	**D**	**O**	**E**	**D**	**O**	**E**	**D**	**Fmns**	**De-trended**	
	GZE	4.9	10	6	21	3	3	4	13	9	25	22	D	Fmns
Cisuralian	ASS-l	2.8	26	10	41	15	6	16	41	16	57	19	-32	3
	ASS-u	2.8	8	14	39	1	4	11	9	18	50	20	7	-1
	SAK-l	5.1	14	15	39	8	3	15	22	18	54	20	-4	0
	SAK-u	5.1	0	11	24	0	2	12	0	13	36	16	18	4
	ART-l	4.4	5	3	18	6	2	16	11	5	34	11	2	5
	ART-u	4.4	0	5	15	2	7	16	2	12	31	10	3	1
	KUN-l	2.5	2	3	12	4	4	13	6	7	25	10	6	0
	KUN-u	2.5	25	32	34	11	17	20	36	49	54	16	-29	-6
Guadalupian	ROA	2.5	12	10	14	23	17	26	35	27	40	20	14	-4
	WOR	2.5	10	9	14	43	47	52	53	56	66	17	-26	3
	CAP-l	2.5	2	0	7	57	2	62	59	2	69	10	-3	7
	CAP-u	2.5	0	1	7	3	53	63	3	54	70	12	-1	-2
Lopingian	WUC-l	3	6	3	12	38	23	48	44	26	60	18	10	-6
	WUC-u	3	3	9	12	71	64	96	74	73	108	19	-48	-1
	CHX	2	10	12	13	40	65	72	50	77	85	17	23	2

Table S2: Combined time bins

Combined Permian time bins			**'Amphibia'**			**Amniota**			**Tetrapoda**				**Detrended**	
		My	**O**	**E**	**D**	**O**	**E**	**D**	**O**	**E**	**D**	**Fmns**	**D**	**Fmns**
	[GZE]	4.9	10	6	21	3	3	4	13	9	25	22		
Cisuralian	ASS	5.6	34	24	49	16	10	17	50	34	66	39	-41	-17
	SAK	10.2	14	26	39	8	5	15	22	31	54	36	12	3
	ART	8.8	5	8	18	8	9	18	13	17	36	21	18	15
	KUN	5	27	35	37	15	21	24	42	56	61	26	-25	-5
Guadalupian	ROA-WOR	5	22	19	24	66	64	69	88	83	93	37	-32	-11
	CAP	5	2	1	7	60	55	65	62	56	72	22	21	15
Lopingian	WUC	6	9	12	15	109	87	119	118	99	134	37	-62	-15
	CHX	2	10	12	13	40	65	72	50	77	85	17	49	20

D—diversity, E—extinctions, Fmns—formations, O—originations. ART—Artiknskian, ASS--Asselian, CAP—Capitanian, CHX—Changhsingian, GZE—Gzelian, KUN—Kungurian, ROA—Roadian, SAK—Sakmarian, WOR—Wordian, WUC—Wuchiapingian.

Table S3: With Olson's Gap

Recalculated with no Roadian formations							
		Tetrapod D	**Fmns**		**Detrended**		
	GZE	25	22		D	Fmns	
Cisuralian	ASS-l	57	19		-32	-3	
	ASS-u	50	20		7	1	
	SAK-l	54	20		-4	0	
	SAK-u	36	16		18	-4	
	ART-l	34	11		2	-5	
	ART-u	31	10		3	-1	
	KUN-l	25	10		6	0	
	KUN-u	66	19		-41	9	
Guadalupian	ROA	0	0		66	-19	ROA
	WOR	82	22		-82	22	
	CAP-l	69	10		13	-12	
	CAP-u	70	12		-1	2	
Lopingian	WUC-l	60	18		10	6	
	WUC-u	108	19		-48	1	
	CHX	85	17		23	-2	

APPENDIX 1

Correlations when the 20 Roadian-age tetrapod-bearing formations are redated

In order to identify 'Olson's gap', spanning the Roadian stage, Lucas (2004) re-dated the 20 geological formations otherwise assigned that age either upwards or downwards. Four tetrapod-bearing formations are re-dated from Roadian (ROA) to Wordian (WOR) and three from Roadian to upper Kungurian (KUN(u)). The other 13 formations have their ranges fore-shortened, by moving their tops downwards or their bases upwards.

1. Abrahamskraal Formation, ROA-CAP = WOR-CAP
2. Belebey Svita, ROA(u) = WOR
3. Biarmian, ROA-WOR = WOR
4. Chickasha Formation, ROA = KUN (u)
5. Ecca Group, SAK-WOR, SAK-KUN(u)
6. Ecca Group (upper), KUN-ROA = KUN
7. Flowerpot Formation, ROA = KUN(u)
8. Golyusherma Svita, ROA = WOR
9. Kazanian (lower), ROA(l) = WOR
10. Kazanian (upper), ROA(u) = WOR
11. Krasnochelsk Svita, ROA-WOR = WOR
12. Nahe Group, SAK(u)-ROA = SAK(u)-KUN(u)
13. Ocher faunal complex, ROA-WOR = WOR
14. Rio do Rasto Formation, ROA(u)-WUC = WOR-WUC
15. Rotliegendes, ASS(l)-WOR, ASS(l)-KUN(u)
16. Rotliegendes (upper), KUN-WOR = KUN(u)
17. San Angelo Formation, ROA = KUN(u)

18. Tierberg Formation, ROA-WUC = WOR-WUC
19. Waterford Formation, KUN-ROA = KUN
20. Zone I (Ezhovo/ Ocher), ROA = WOR

APPENDIX 2

Re-dating of the Roadian-age tetrapods to create 'Olson's gap'

When the Roadian-age geological formations are redated (Appendix 1), the ages of 40 tetrapod genera are affected: 28 genera are re-assigned downwards to the Kungurian or upwards to the Wordian. Others have their overall ranges shortened so they become extinct before the Roadian or originate after the Roadian. The list does not include Mezen' taxa, as they are all dated as Wordian.

Taxa that shift from ROA to KUN(u) (12)

'AMPHIBIA'
Kourerpeton
Slaughtenhopia

AMNIOTA
Kahneria
Rothianiscus
Gorgodon
Knoxosaurus
Steppesaurus
Angelosaurus
Caseoides
Caseopsis
Varanodon
Watongia

Taxa that shift from ROA to WOR (16)

'AMPHIBIA'
Biarmica
Bashkirosaurus
Collidosuchus
Koinia
Melosaurus
Uralosuchus
Iratosaurus
Kamacops

AMNIOTA
Rhipaeosaurus
Tokosaurus
Protocaptorhinus
Gecatogomphius
Phthinosaurus
Microsyodon
Kamagorgon
Eodicynodon

Taxa that shorten ranges, but do not shift (13)

'AMPHIBIA'
Leptoropha
Konzhukovia
Discosauriscus
Diplocaulus

AMNIOTA
Belebey
Davietkulia
Macroleter
Bashkyroleter
Emeroleter
Nycteroleter
Lanthanolania
Cotylorhynchus
Pyozia