

Which app is Good?

BumpRecorder vs RoadLab Pro



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The World Bank also developed app

BumpRecorder

Original development

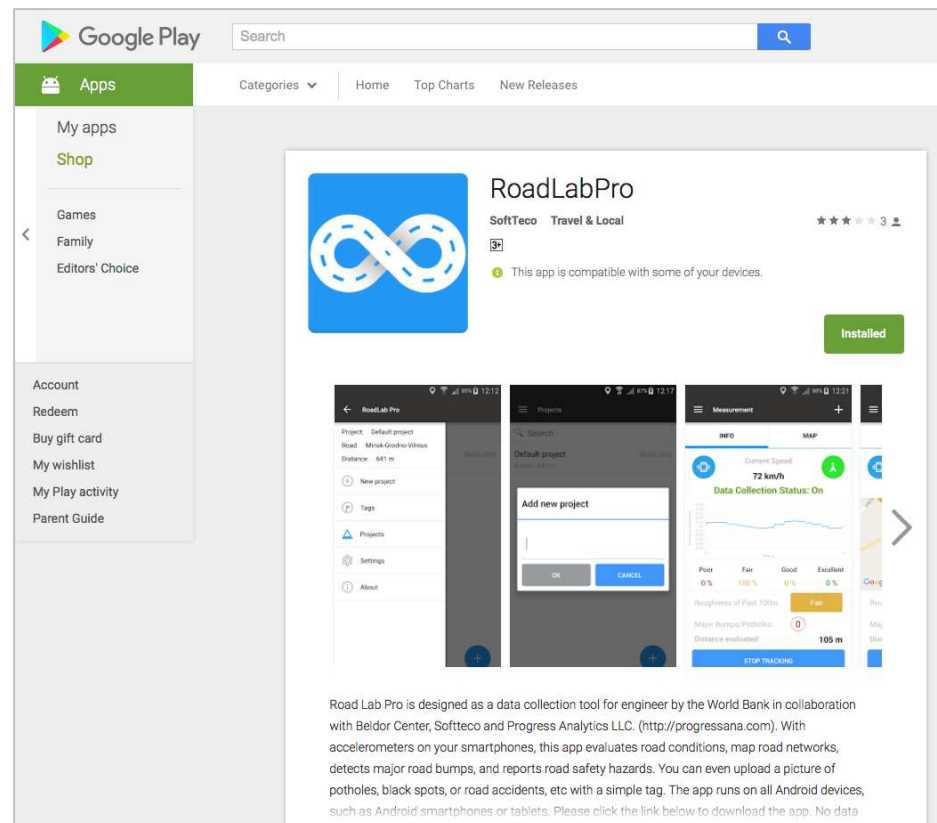
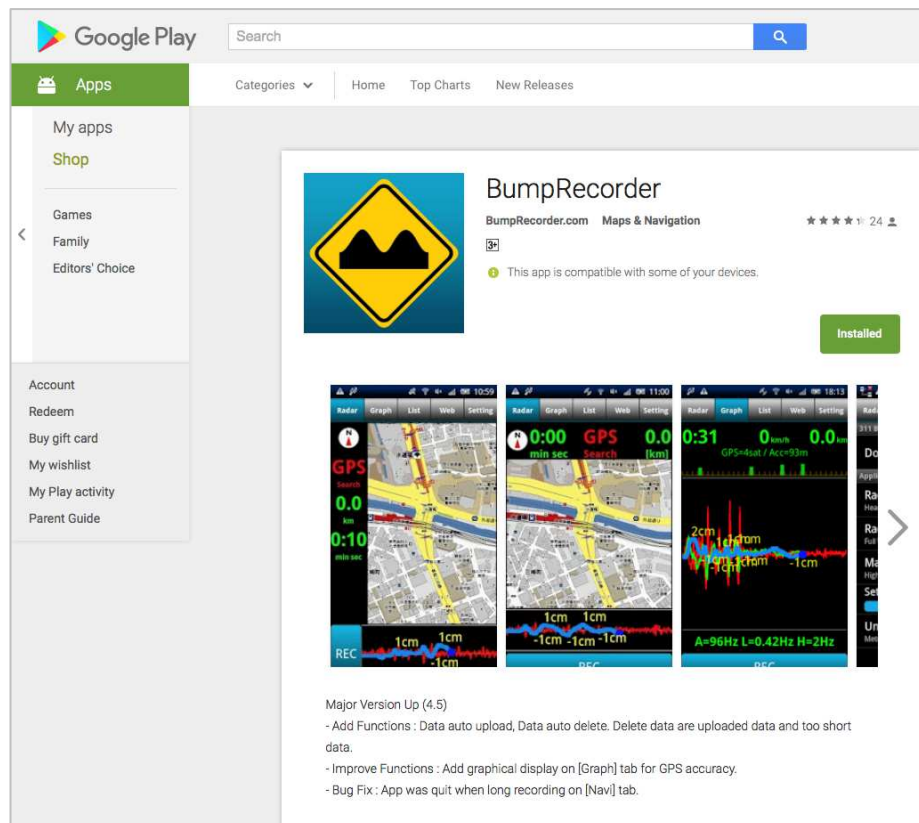
2011 start to provide App

2014 start to provide Web

RoadLab Pro

Developed with Virginia Tech

At 2015 TRB proposed





RoadLab Pro's data items

Calculate index is only IRI

Section Length is only about 100m

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	time	speed	category	start_lat	start_lon	end_lat	end_lon	is_fixed	iri	distance	suspension		
2	10:57:16 2017-September-10	21.96	GOOD	35.7766851	139.7041409	35.7762066	139.7036073	FALSE	2.39	104.0	MEDIUM		
3	10:57:33 2017-September-10	20.14	GOOD	35.7762066	139.7036073	35.7758400	139.7026495	FALSE	2.27	107.2	MEDIUM		
4	10:57:57 2017-September-10	28.50	GOOD	35.7757613	139.7026816	35.7748912	139.7029124	FALSE	2.08	103.9	MEDIUM		
5	10:58:19 2017-September-10	24.38	GOOD	35.7748500	139.7029210	35.7749237	139.7039082	FALSE	2.47	103.3	MEDIUM		
6	10:58:33 2017-September-10	24.53	GOOD	35.7749381	139.7039889	35.7754575	139.7045294	FALSE	2.62	108.7	MEDIUM		
7	10:59:14 2017-September-10	35.10	GOOD	35.7755352	139.7045026	35.7755352	139.7045026	FALSE	3.14	101.1	MEDIUM		
8	11:00:00 2017-September-10	19.28	EXCELLENT	35.7792251	139.7032307	35.7793173	139.7025016	FALSE	1.66	100.7	MEDIUM		
9	11:00:50 2017-September-10	26.71	GOOD	35.7792892	139.7024214	35.7792410	139.7022644	FALSE	2.11	102.8	MEDIUM		
10	11:01:31 2017-September-10	20.94	GOOD	35.7785797	139.7003596	35.7785051	139.7000871	FALSE	2.42	112.5	MEDIUM		
11	11:02:17 2017-September-10	33.00	EXCELLENT	35.7777492	139.6979912	35.7774427	139.6972710	FALSE	1.00	104.1	MEDIUM		
12	11:02:30 2017-September-10	37.71	EXCELLENT	35.7774033	139.6971788	35.7773096	139.6969627	FALSE	1.72	104.8	MEDIUM		
13	11:05:08 2017-September-10	23.52	EXCELLENT	35.7760369	139.6951395	35.7756140	139.6956107	FALSE	1.00	124.0	MEDIUM		
14	11:05:37 2017-September-10	29.58	GOOD	35.7753724	139.6958718	35.7748945	139.6964569	FALSE	2.13	105.9	MEDIUM		
15	11:05:50 2017-September-10	39.35	GOOD	35.7746417	139.6967955	35.7742664	139.6972283	FALSE	2.91	103.9	MEDIUM		
16	11:06:29 2017-September-10	27.13	EXCELLENT	35.7736597	139.6996277	35.7737706	139.6998564	FALSE	1.15	105.0	MEDIUM		
17	11:06:37 2017-September-10	33.30	GOOD	35.7739688	139.7002826	35.7739688	139.7002826	FALSE	2.40	102.0	MEDIUM		
18	11:06:48 2017-September-10	42.30	EXCELLENT	35.7745089	139.7014225	35.7745089	139.7014225	FALSE	1.00	100.1	MEDIUM		
19	11:07:29 2017-September-10	27.90	EXCELLENT	35.7750326	139.7045459	35.7750326	139.7045459	FALSE	1.00	101.4	MEDIUM		
20	11:08:48 2017-September-10	16.20	EXCELLENT	35.7758877	139.7089080	35.7758877	139.7089080	FALSE	1.24	100.2	MEDIUM		
21	11:10:23 2017-September-10	15.70	EXCELLENT	35.7763780	139.7110372	35.7763893	139.7110853	FALSE	1.48	104.4	MEDIUM		
22	11:11:55 2017-September-10	30.60	EXCELLENT	35.7802491	139.7146156	35.7802491	139.7146156	FALSE	1.00	100.7	MEDIUM		
23	11:12:08 2017-September-10	42.46	EXCELLENT	35.7814939	139.7156802	35.7816498	139.7160486	FALSE	1.00	103.3	MEDIUM		
24	11:13:48 2017-September-10	33.22	GOOD	35.7800707	139.7171025	35.7796448	139.7165310	FALSE	3.13	106.1	MEDIUM		
25	11:14:10 2017-September-10	41.32	EXCELLENT	35.7787622	139.7153777	35.7785612	139.7150805	FALSE	1.32	103.6	MEDIUM		



BumpRecorder's data items

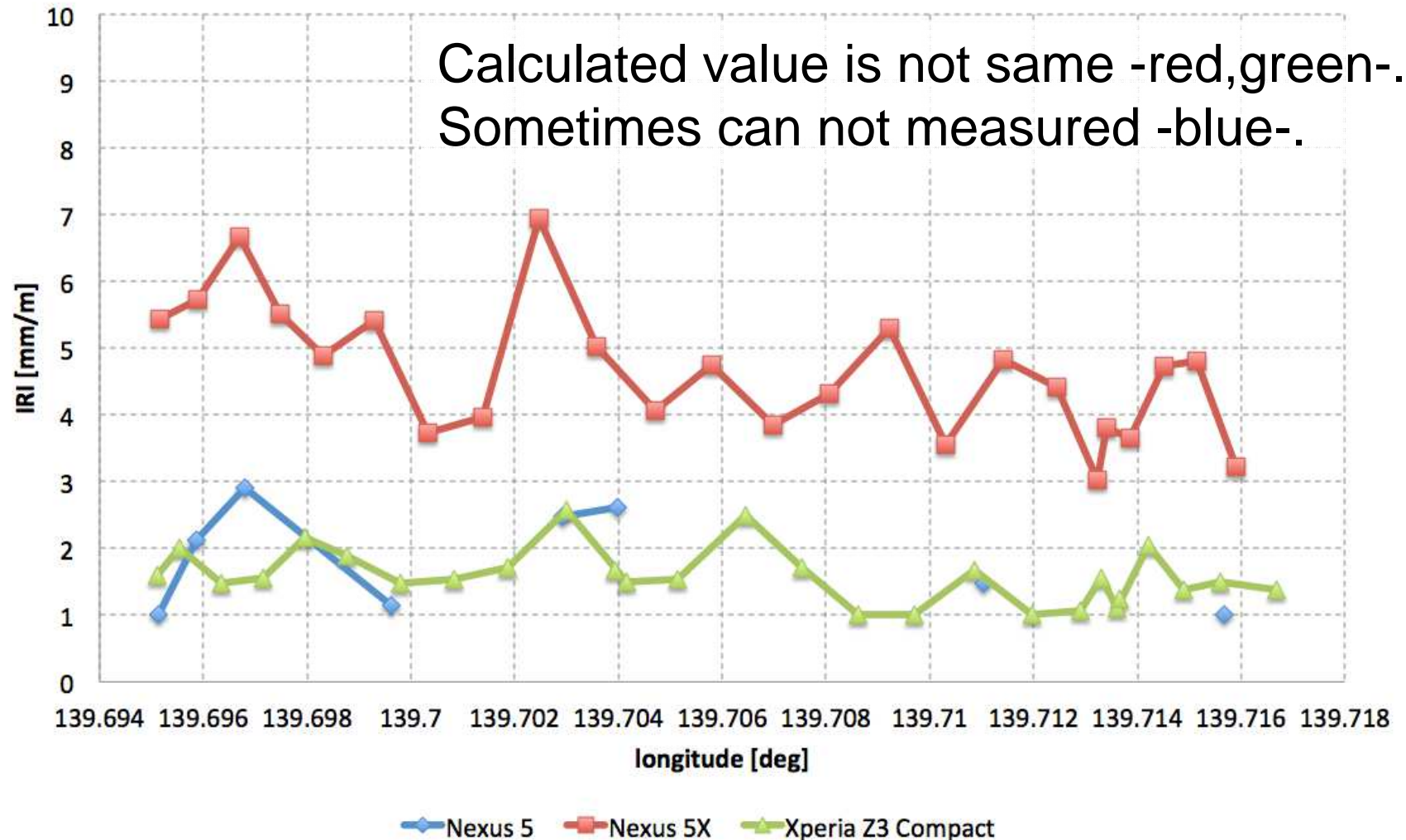
Section are 20m,40m,80m,160m Indexes are IRI, JRI, Crack...

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	datetime	devicetime	meshsize	latcode	loncode	lat1	lon1	lat2	lon2	I	speed	iri	jri	crack	linearity	mci	pcr
2	20170910_095702	1505005100384	2	314228	1144454	35.777022	139.703946	35.77722	139.703904	22.3	6.83	3.77	2.35	0.65	3.59	8.04	83.6
3	20170910_095702	1505005101829	2	314230	1144452	35.77722	139.703904	35.777418	139.70381	23.5	9.2	4.73	3.44	0	2.21	9.4	78.7
4	20170910_095702	1505005104326	2	314232	1144452	35.777418	139.70381	35.777616	139.703718	23.4	9.34	6.63	6.05	0	2.34	9.33	71.4
5	20170910_095702	1505005106740	2	314234	1144452	35.777616	139.703718	35.777814	139.703623	23.6	8.49	5.99	4.06	0	7.11	9.38	73.5
6	20170910_095702	1505005109635	2	314236	1144450	35.777815	139.703623	35.778012	139.703552	22.8	7.99	7.29	4.61	0	6.26	9.36	69.6
7	20170910_095702	1505005112470	2	314238	1144450	35.778012	139.703551	35.77821	139.703483	22.8	7.81	5.87	3.18	0	5.16	9.41	73.9
8	20170910_095702	1505005115328	2	314240	1144450	35.778211	139.703483	35.778408	139.703442	22.3	7.37	9.45	5.78	0	5.03	9.33	65.5
9	20170910_095702	1505005118244	2	314242	1144450	35.778409	139.703442	35.778606	139.703402	22.2	7.33	8.34	3.31	0	3.6	9.4	67.3
10	20170910_095702	1505005121180	2	314244	1144450	35.778607	139.703402	35.778804	139.703375	22.1	7.04	10.21	8.18	0	6.39	9.28	64.5
11	20170910_095702	1505005124480	2	314246	1144448	35.778805	139.703375	35.779002	139.703325	22.4	6.62	9.7	7.37	0	9.6	9.3	65.2
12	20170910_095702	1505005127678	2	314248	1144448	35.779003	139.703325	35.779201	139.703275	22.4	6.53	4.86	3.91	0	4.38	9.38	78.1
13	20170910_095702	1505005131432	2	314250	1144448	35.779201	139.703275	35.779399	139.70316	24.3	2.8			0			
14	20170910_095702	1505005161866	2	314252	1144446	35.779527	139.703125	35.779449	139.702881	23.6	2.91			0			
15	20170910_095702	1505005170250	2	314250	1144444	35.779448	139.702881	35.779364	139.702637	23.8	4.1		3.09	0	2.09	9.41	
16	20170910_095702	1505005170250	2	314252	1144444	35.779448	139.702881	35.779399	139.702743	13.6	4.01	3.93					
17	20170910_095702	1505005173250	2	314250	1144444	35.779399	139.702742	35.779364	139.702637	10.2	4.23	4.52					
18	20170910_095702	1505005175484	2	314250	1144442	35.779364	139.702636	35.7793	139.702393	23.1	3.81	2.97	2.16	0	25.79	9.45	89.6
19	20170910_095702	1505005181877	2	314248	1144440	35.779299	139.702392	35.779192	139.702149	24.9	5.9	3.58	2.43	0	13.55	9.44	85.3
20	20170910_095702	1505005185658	2	314248	1144438	35.779192	139.702148	35.779104	139.701904	24.1	7.38	3.44	2.66	0	2.17	9.43	86.2
21	20170910_095702	1505005188808	2	314248	1144436	35.779104	139.701904	35.779037	139.701661	23.2	8.12	4.37	3.17	0	1.42	9.41	80.6
22	20170910_095702	1505005191766	2	314246	1144434	35.779037	139.70166	35.778953	139.701416	23.8	9.57	2.9	2.15	0	0.89	9.45	90.1
23	20170910_095702	1505005194145	2	314246	1144432	35.778953	139.701416	35.778866	139.701172	24	10.18	2.27	1.59	0	0.77	9.48	95.5
24	20170910_095702	1505005196365	2	314244	1144430	35.778866	139.701172	35.778767	139.700928	24.5	9.41	3.77	2.58	0	1.02	9.43	84
25	20170910_095702	1505005199021	2	314244	1144428	35.778767	139.700928	35.77869	139.700684	23.6	8.65	2.59	2.05	0	1.22	9.46	92.7



RoadLab Pro calculat IRI value

Using different Smartphone

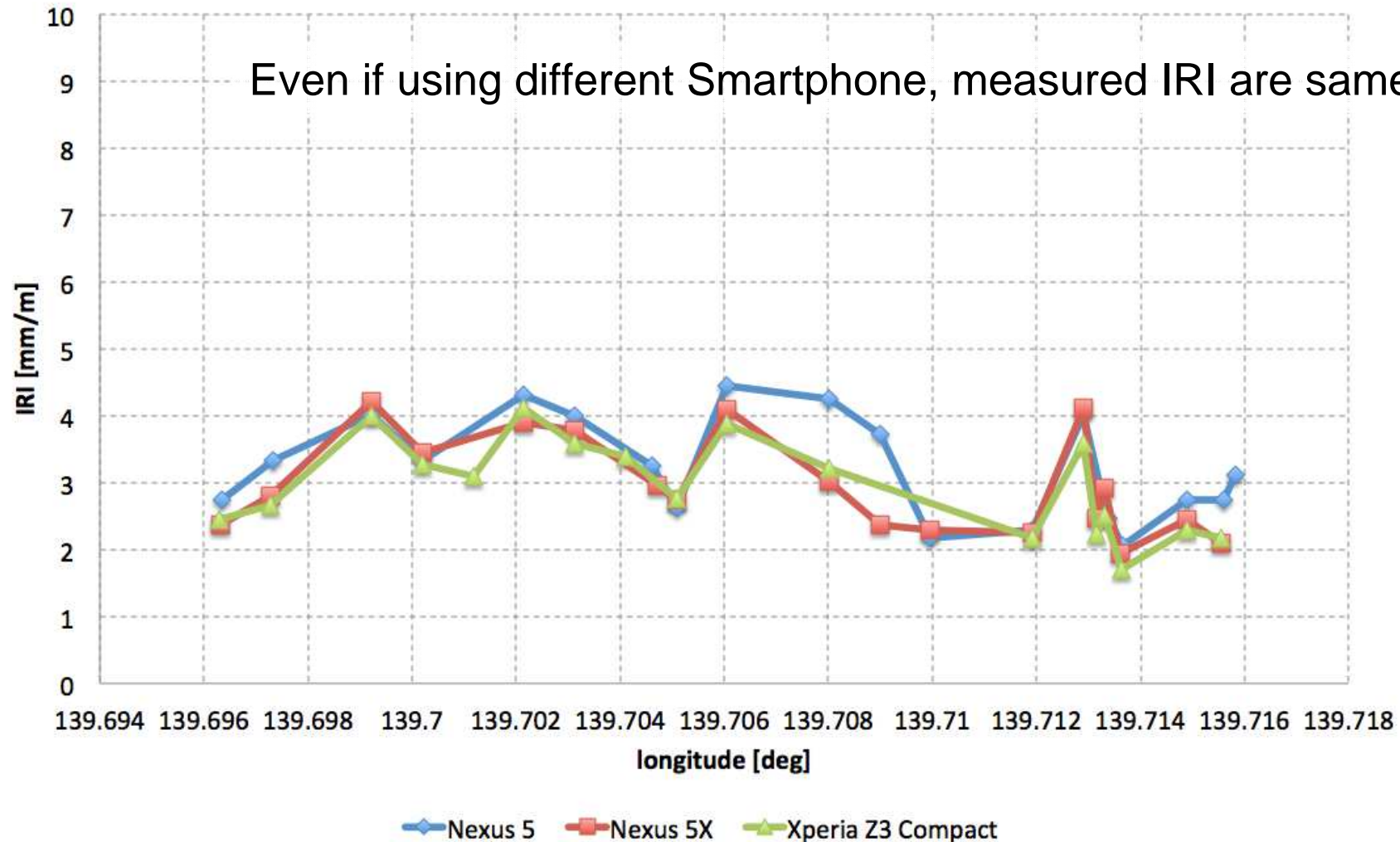




BumpRecorder calculate IRI value

Using different Smartphone

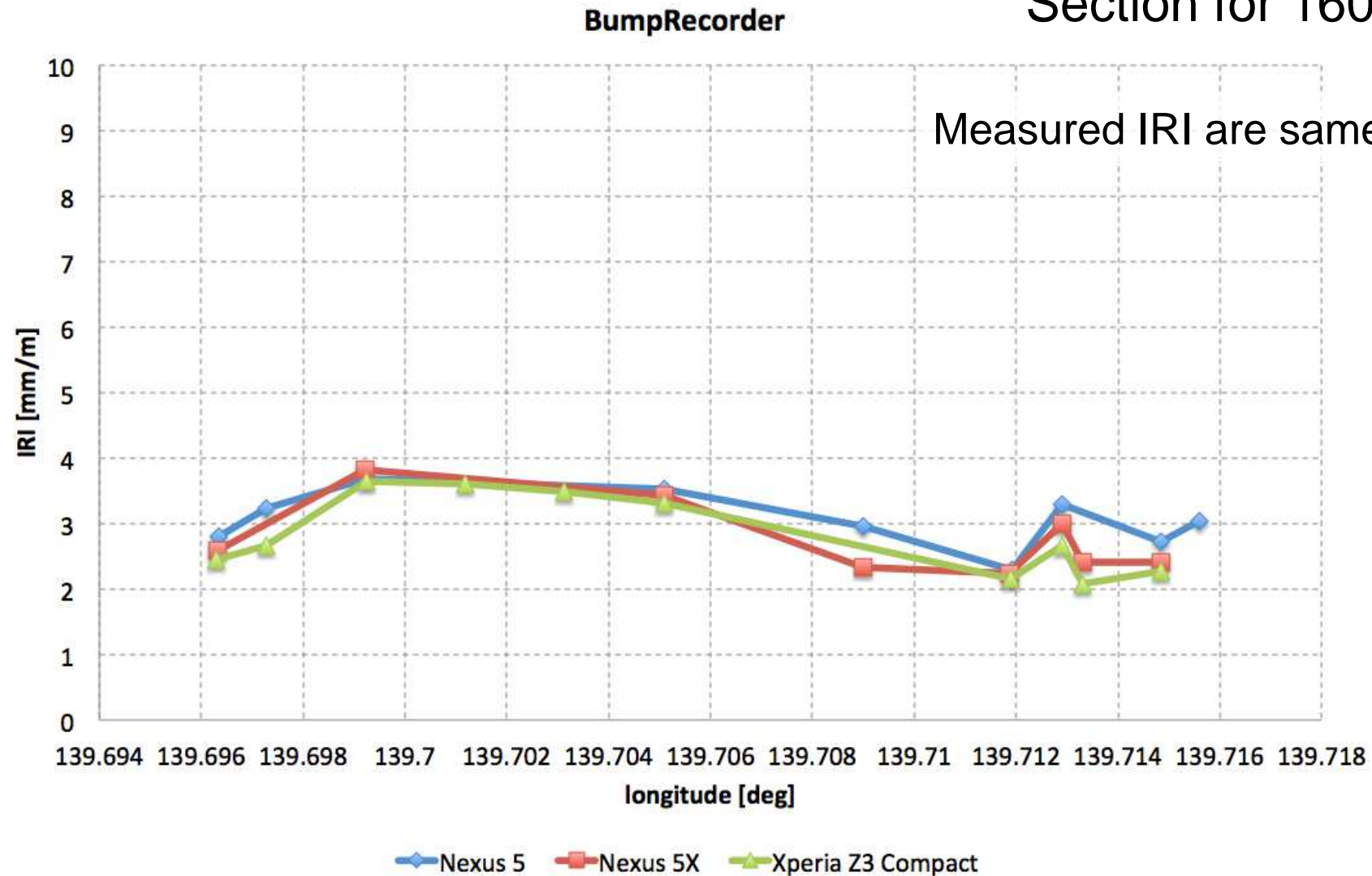
Section for 80m





BumpRecorder IRI value are stable

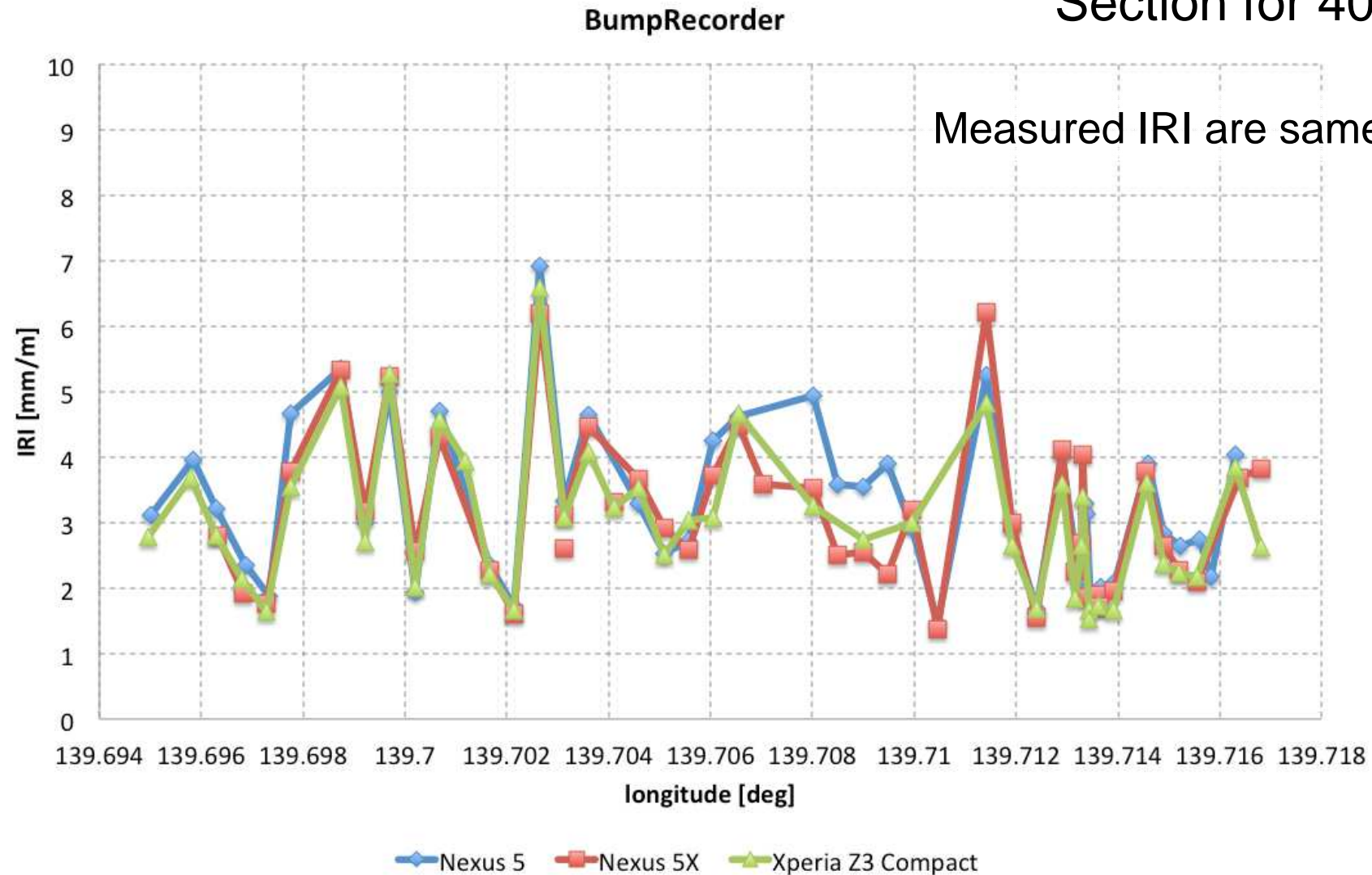
Section for 160m





BumpRecorder IRI value are stable

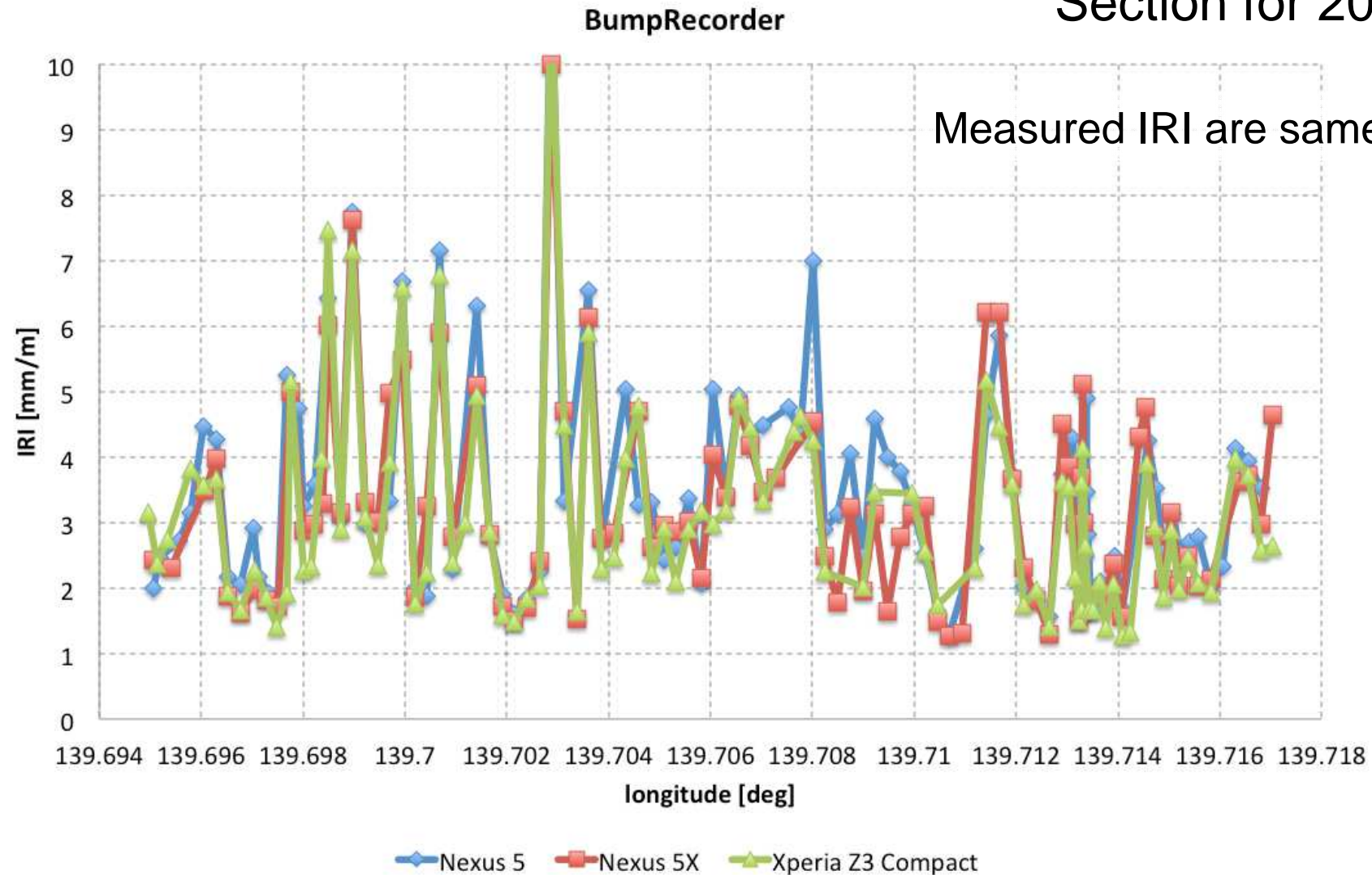
Section for 40m





BumpRecorder IRI value are stable

Section for 20m

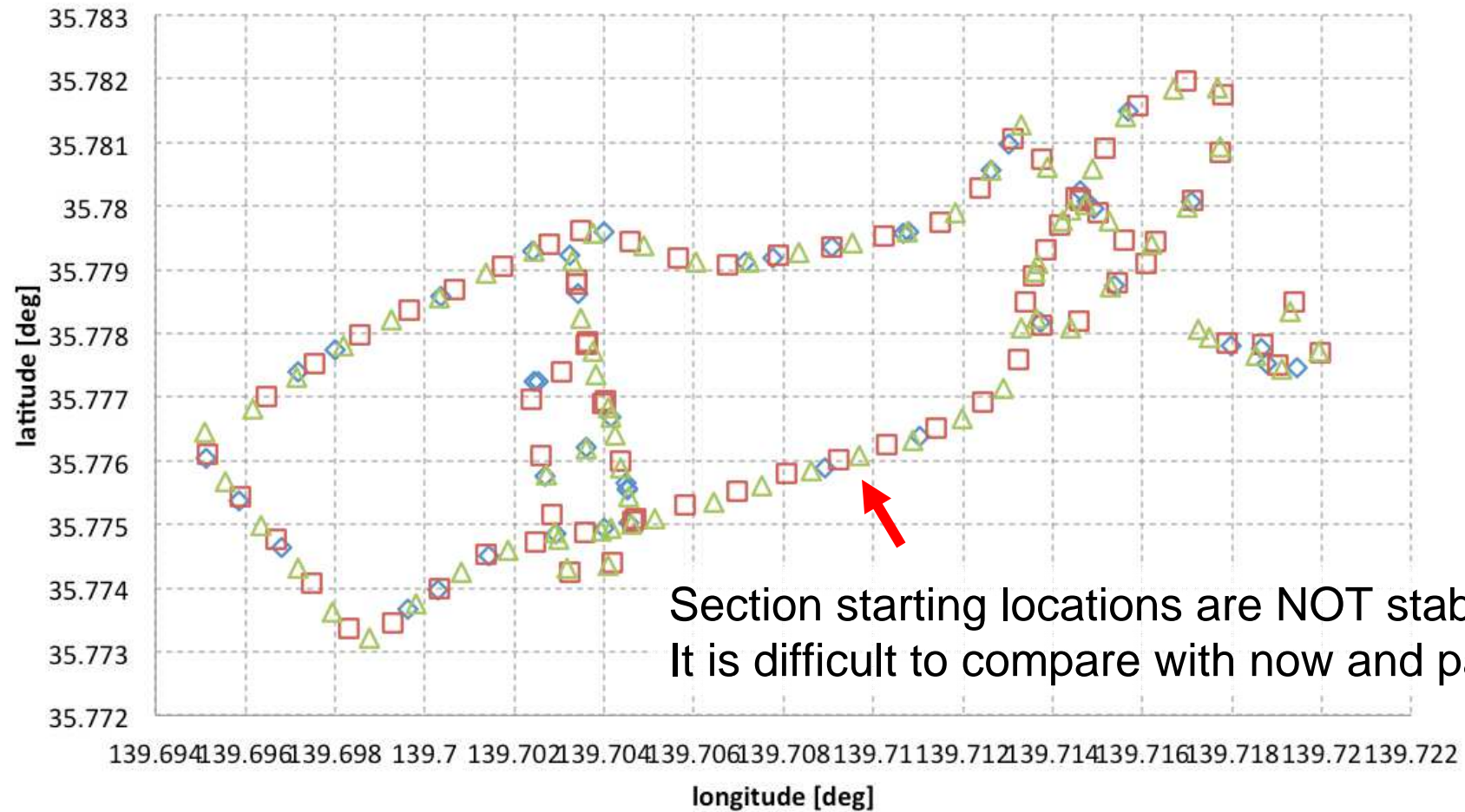




RoadLab Pro IRI calculation sections

3 times measurement

RoadLab Pro



◇ Nexus 5 □ Nexus 5X △ Xperia Z3 Compact

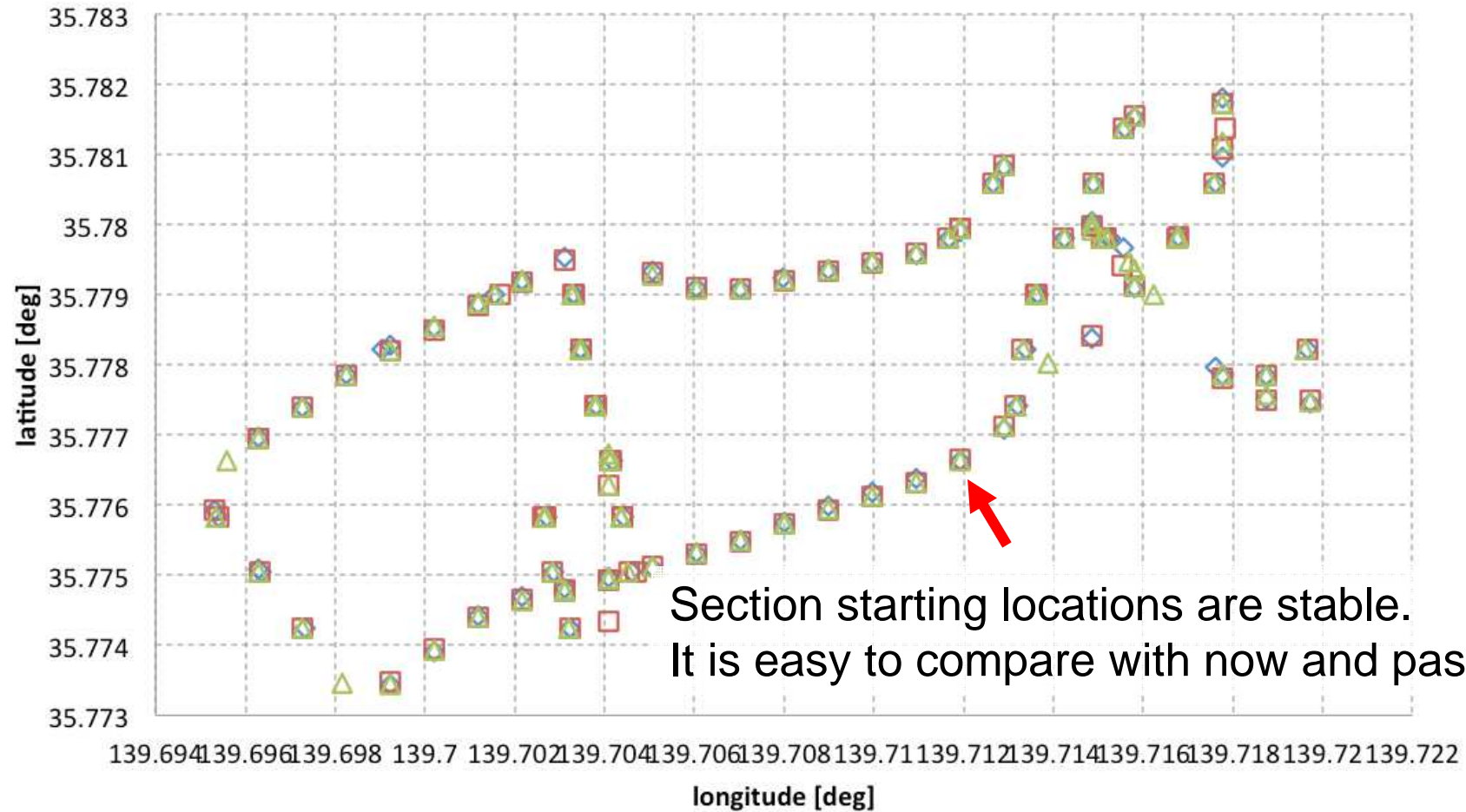


BumpRecorder IRI calculation sections

3 times measurement

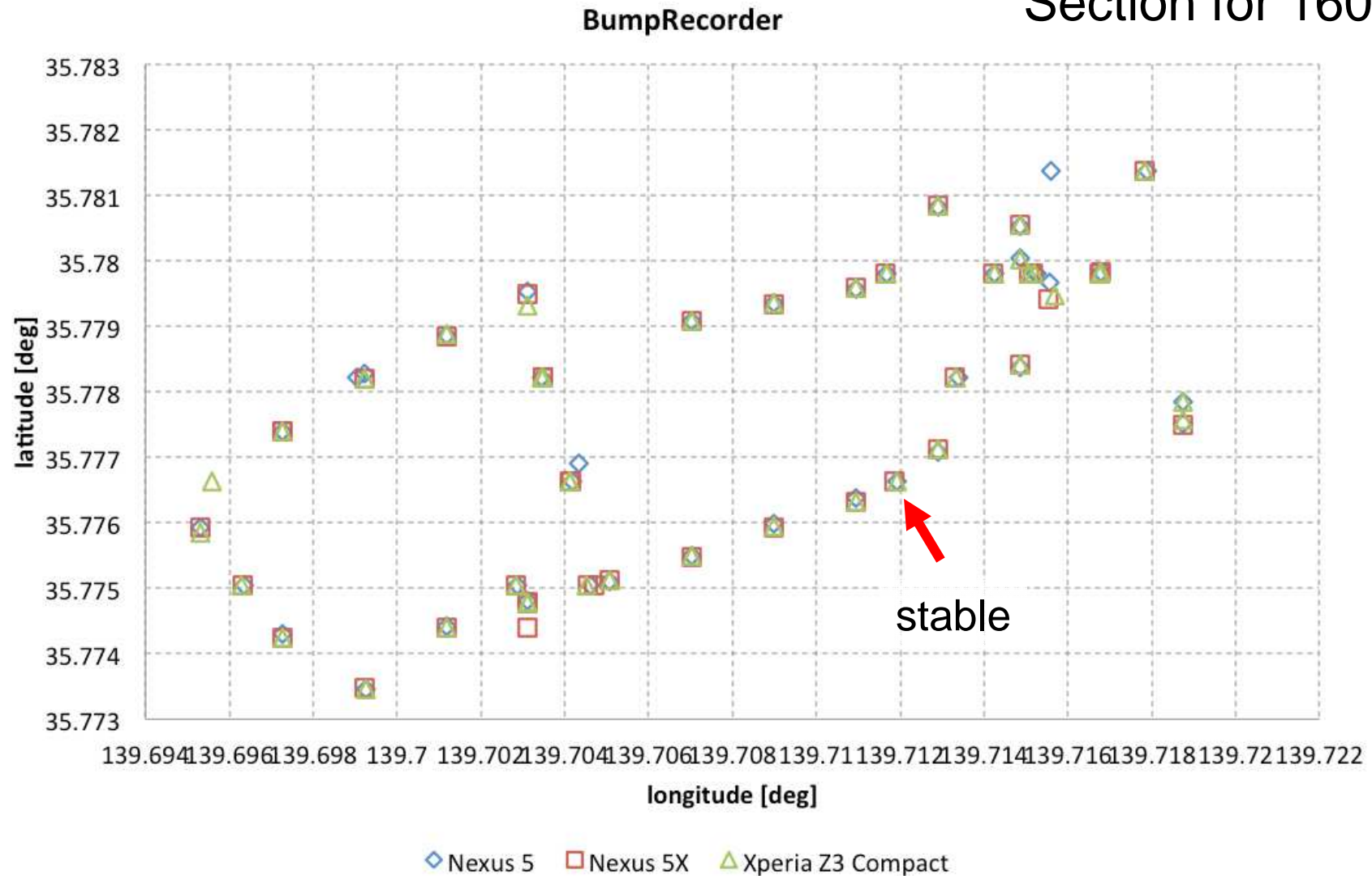
BumpRecorder

Section for 80m



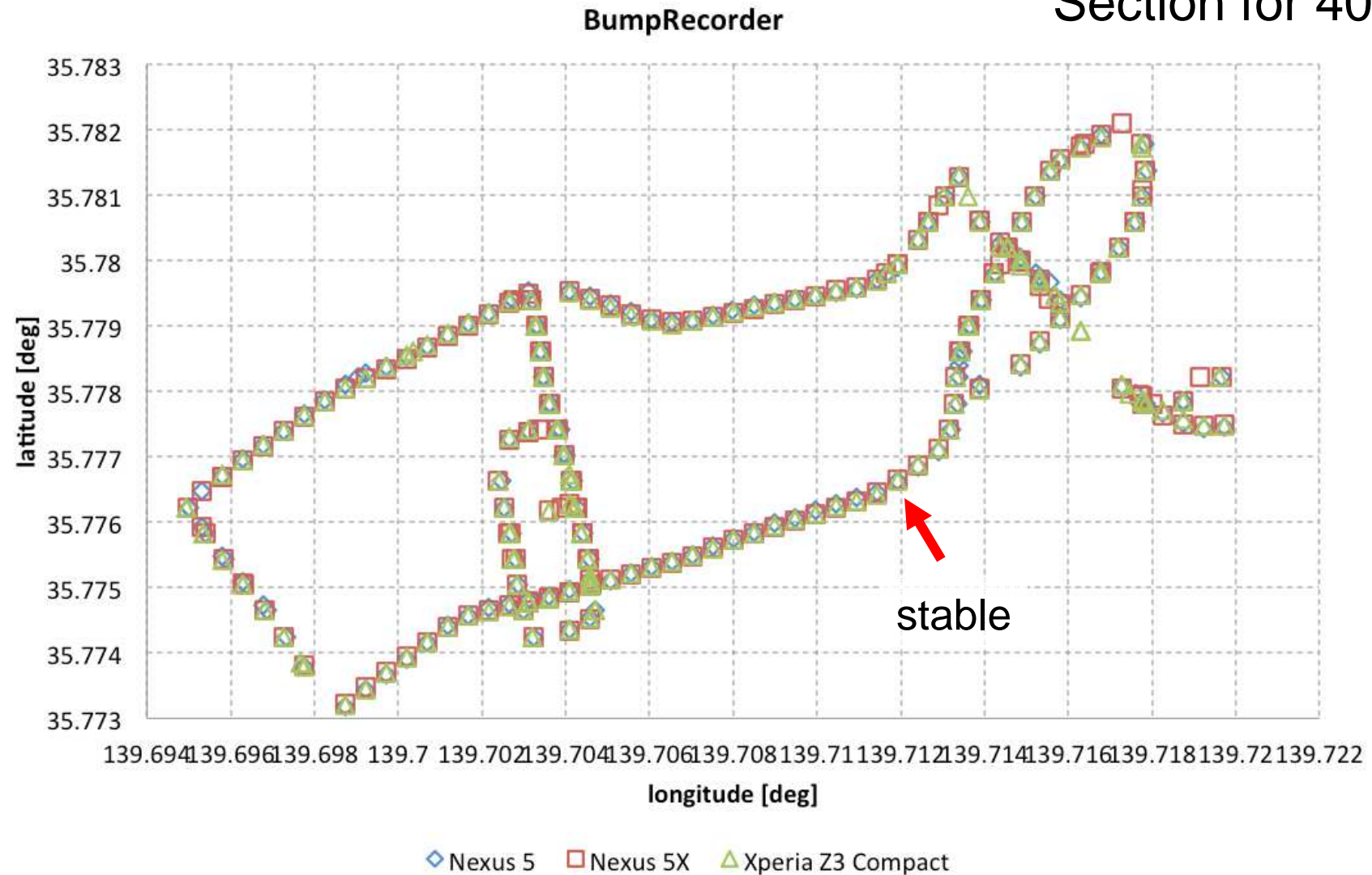
BumpRecorder sections are stable

Section for 160m



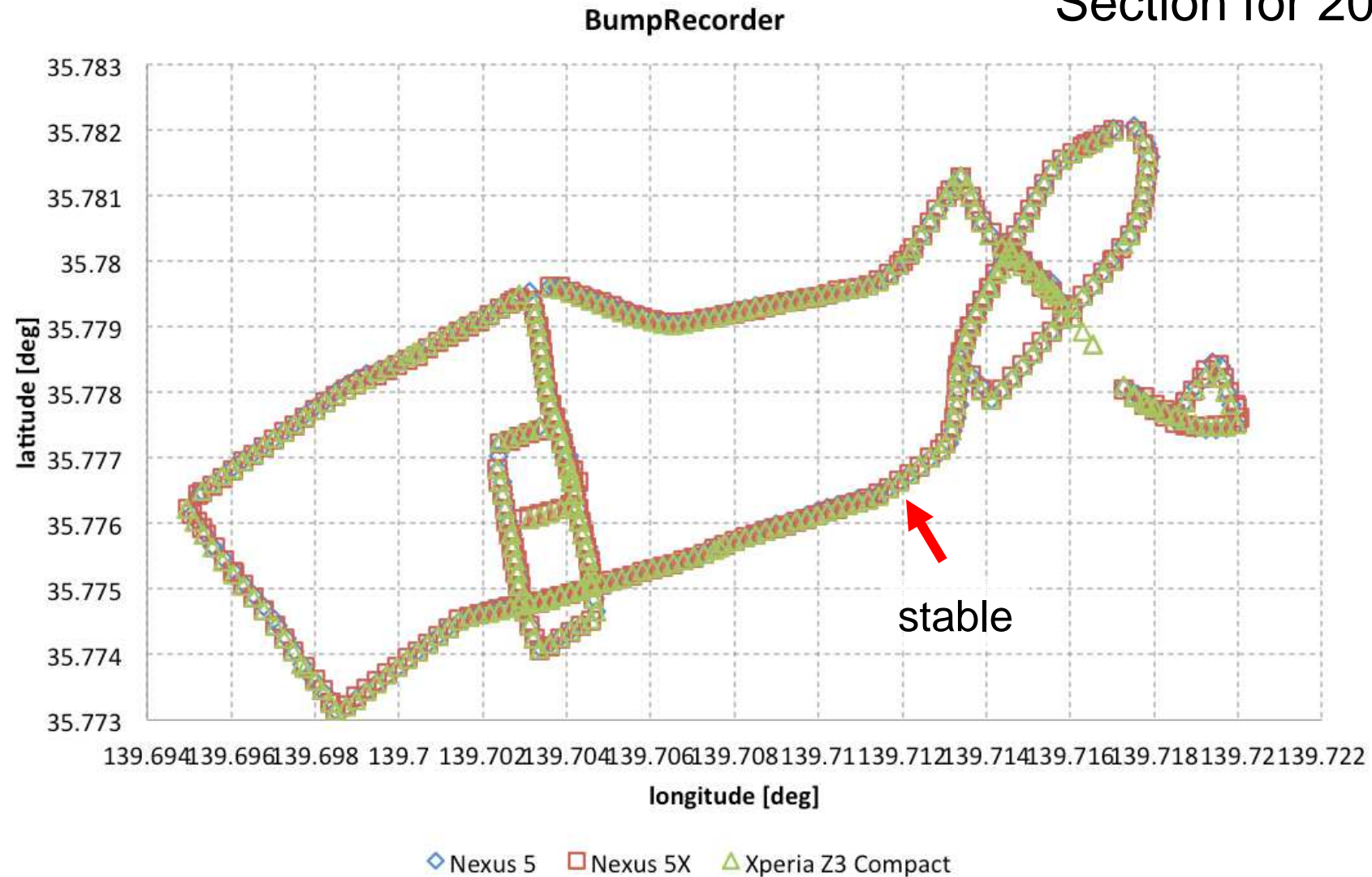
BumpRecorder sections are stable

Section for 40m



BumpRecorder sections are stable

Section for 20m





Conclusions

- IRI measurement by using Smartphone is global trend.
- The world Bank also developed "RoadLab Pro".

RoadLab Pro

- It can calculate **only IRI**.
 - Calculated **IRI are different** by using different Smartphone.
 - Section length is **only about 100m**.
 - Section starting location is different for each measurements.
- It is **difficult to compare** with current and past situations.

BumpRecorder

- It can calculate **IRI, JRI, Crack, MCI, PCR, Linearity**.
 - Calculated **IRI are stable**, even if using different Smartphone.
 - Section length can be used about **20m, 40m, 80m 160m**.
 - Section starting location is same for each measurements.
- It is **easy to compare** with current and past situations.