Appendix 2

Comparison between PR and AMeDAS ground gauge network

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Introduction

Comparison between PR(2A25) and AMeDAS ground gauge network

- Area size: $0.5^o \times 0.5^o$ – wide area (west Japan)
- Period: January, June, and July in 2001, 2008, and 2009
- Annual rainfall amounts are compared in 2008 and 2009

Today's topics:

- Review
- Comparison between V6 and V7 (OAT7) in the wide area

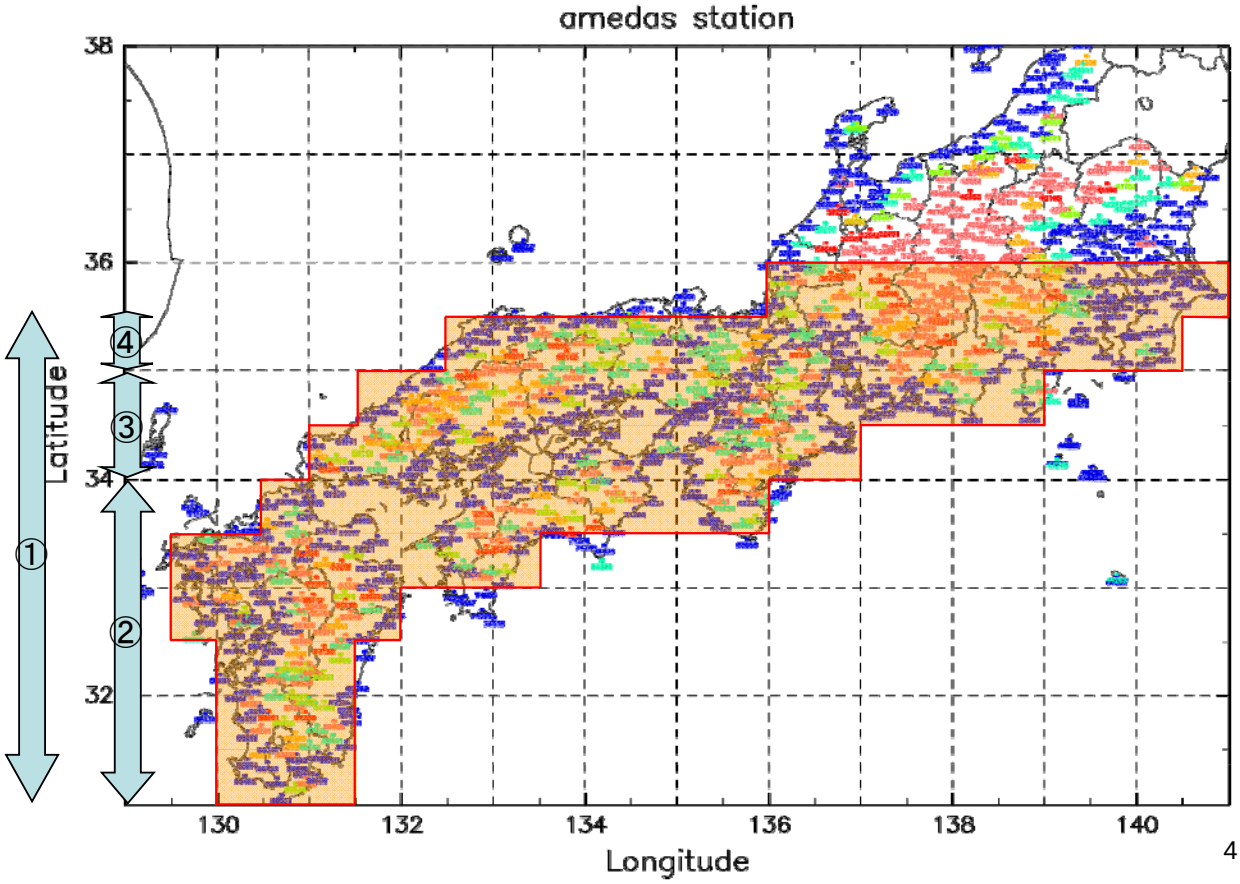
In this study, we have analyzed PR(2A25) and AMeDAS hourly rainfall rate.
All of PR angle bins (49) are used for this analysis.

Case 1：Monthly comparison

- Rainfall comparison between an AMeDAS station and PR inside $0.2^o \times 0.2^o$ boxes centered the AMeDAS station.
  Area: Figure 1
  ① All ：31^o-35.5^o
  ② Heavy rain area：31^o-34^o including Kyusyu and the Pacific Ocean coast
  ③ Light rain area：34^o-35^o showing good relations
  ④ Mountain district：35^o-35.5^o
- In order to compare rainfalls between PR and AMeDAS, we define a difference as follows

$$\frac{1}{stations}\left(\sum_{stations}\frac{\mathrm{PR}-\mathrm{AMeDAS}}{\mathrm{AMeDAS}}\right)\times 100(\%)$$

Figure 1



January 2001

improved
exacerbated

Differences for each parameter (%).
Numbers in parenthesis indicate observation number.

parameter		V6	V7 ITE206	V7 ITE220	V7 ITE221
31º-35.5º ①	All	-23.63(1655)	-21.51(1601)	-21.08(1601)	-21.06(1601)
	0-10mm/h	-23.51(1643)	-21.31(1589)	-20.89(1589)	-20.87(1589)
	more than 10mm/h	-40.14(12)	-47.89(12)	-45.88(12)	-45.90(12)
31º-34º ②	All	-22.95(662)	-23.48(651)	-23.20(651)	-23.21(651)
	0-10mm/h	-22.63(650)	-23.02(639)	-22.78(639)	-22.78(639)
	more than 10mm/h	-40.14(12)	-47.89(12)	-45.88(12)	-45.90(12)
34º-35º ③	All	-11.42(642)	-6.33(619)	-5.52(619)	-5.47(619)
	0-10mm/h	-11.42(642)	-6.33(619)	-5.52(619)	-5.47(619)
	more than 10mm/h	----(0)	----(0)	----(0)	----(0)
35º-35.5º ④	All	-47.27(351)	-46.04(331)	-46.00(331)	-46.00(331)
	0-10mm/h	-47.27(351)	-46.04(331)	-46.00(331)	-46.00(331)
	more than 10mm/h	----(0)	----(0)	----(0)	----(0)

June 2001

improved
exacerbated

parameter		V6	V7 ITE206	V7 ITE220	V7 ITE221
31º-35.5º ①	All	-22.09(2483)	-24.78(2459)	-23.31(2459)	
	0-10mm/h	-21.17(2299)	-23.34(2274)	-21.96(2274)	
	more than 10mm/h	-33.60(184)	-42.47(185)	-39.83(185)	
31º-34º ②	All	-22.25(809)	-24.54(799)	-23.42(799)	
	0-10mm/h	-19.21(724)	-21.41(713)	-20.48(713)	
	more than 10mm/h	-48.16(85)	-50.51(86)	-47.81(86)	
34º-35º ③	All	-17.25(1170)	-21.55(1161)	-19.76(1161)	
	0-10mm/h	-17.01(1077)	-20.31(1068)	-18.57(1068)	
	more than 10mm/h	-20.08(93)	-35.77(93)	-33.35(93)	
35º-35.5º ④	All	-33.06(504)	-32.65(499)	-31.39(499)	
	0-10mm/h	-33.02(498)	-32.68(493)	-31.46(493)	
	more than 10mm/h	-36.91(6)	-31.00(6)	-25.75(6)	

Table of months analyzed here:

		V6	V7 ITE206	V7 ITE220	V7 ITE221	V7 ITE225
2001	January	✓	✓	✓	✓	
	June	✓	✓	✓		
	July	✓	✓	✓		
2008	January	✓				✓
	June	✓				✓
	July	✓				✓
2009	January	✓				✓
	June	✓				✓

Summary (Case 1)

- January : Improved
- June : Not Improved in both 2001 and 2008 (a lot of rain)
- July : Improved in 2001 and 2008. Not changed in 2009.

  - Months having a lot of rain do not improve (?)

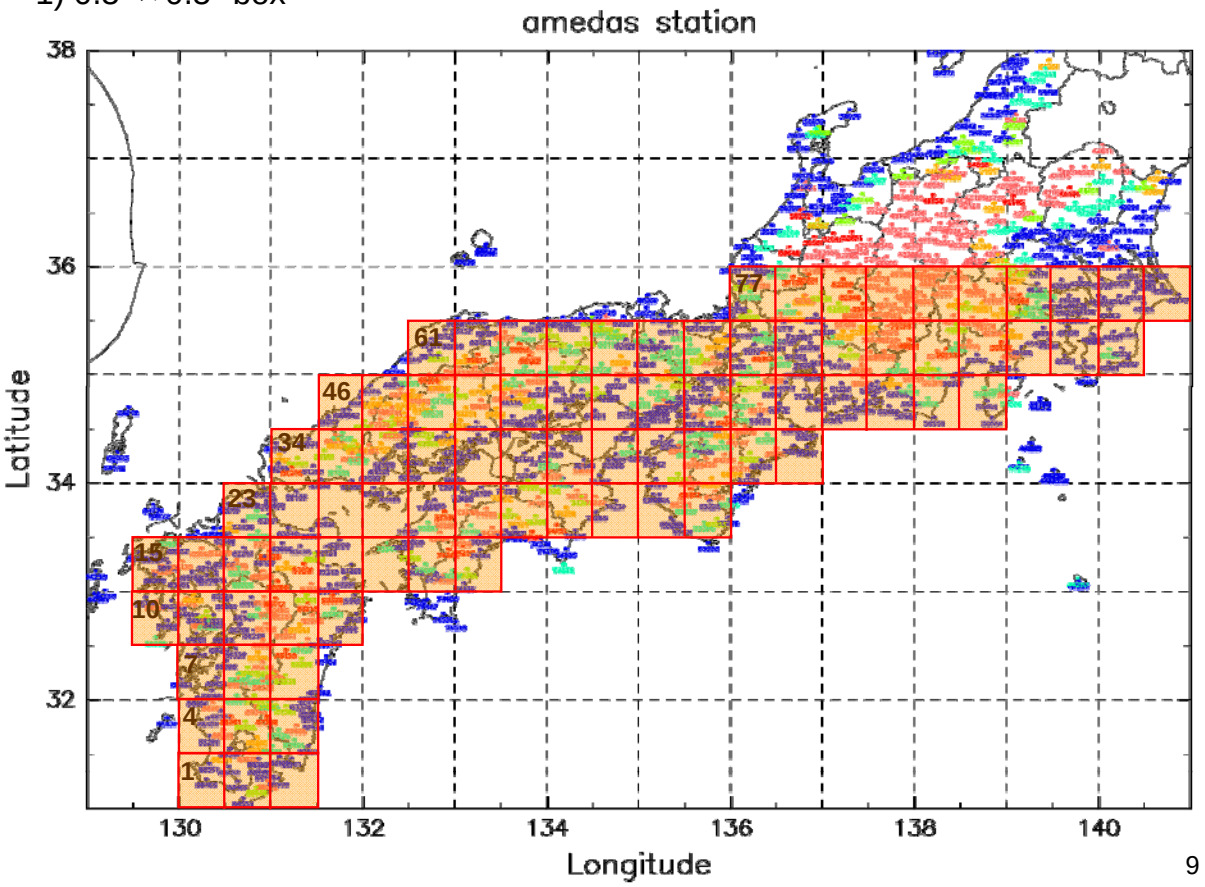
Case 2 : Annual rainfall comparison in 2008 and 2009

1) $0.5^{o} \times 0.5^{o}$ boxes in the west Japan.

2) wide area

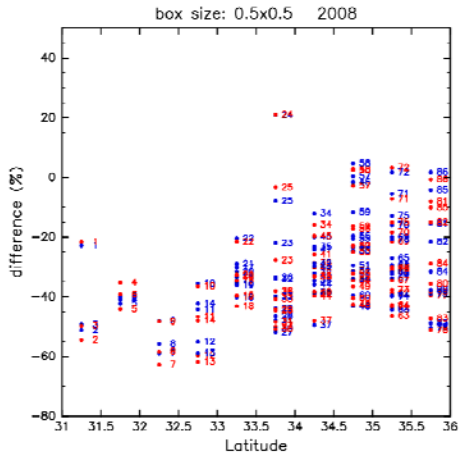
3) Intensity categories

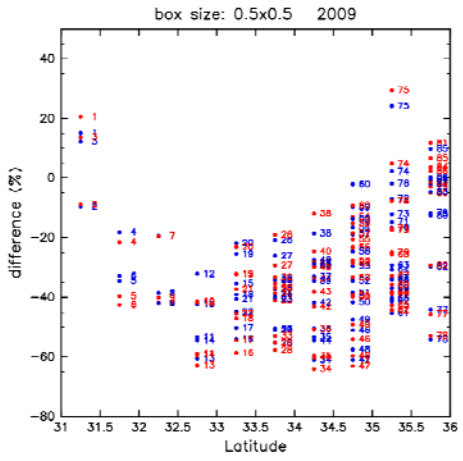
1) 0.5º × 0.5º box



Left: 2008
Right: 2009

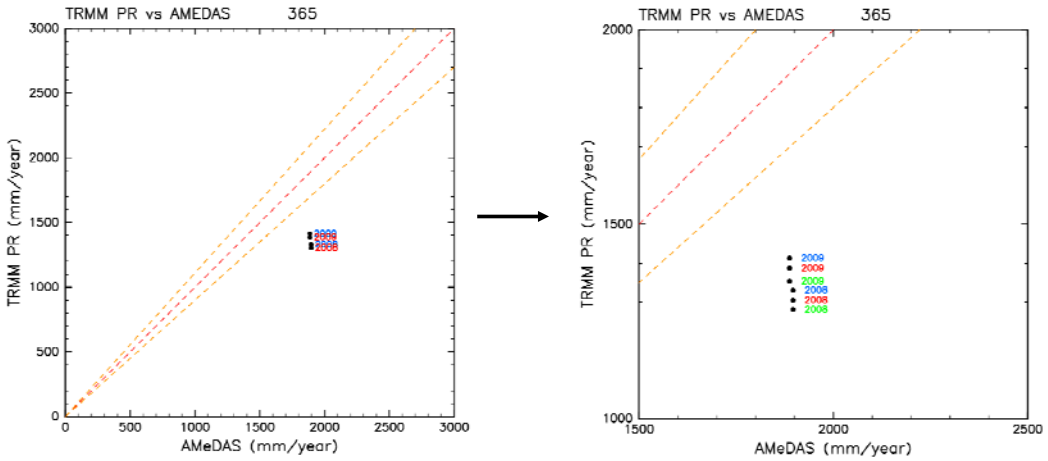
Blue : V6
Red : V7





➢ Large differences are not seen between V6 and V7

2) Wide area merged $0.5^{o} \times 0.5^{o}$ boxes

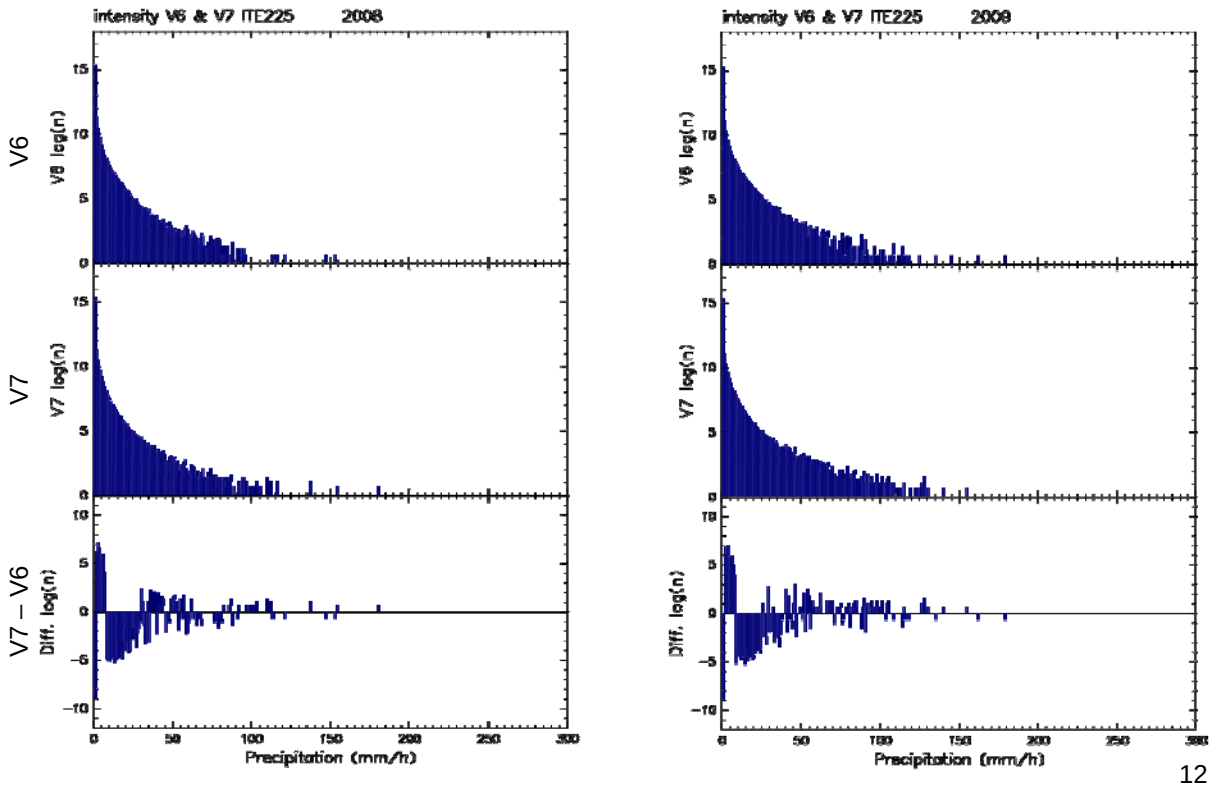


➢ Rainfall amounts in 2008 and 2009 decrease (exacerbated)

	2008	2009
V6	-29.8%	-25.2%
V7 ITE225	-31.2%	-26.5%
V7 OAT_7	-32.5%	-28.3%

3) Intensity categories in the wide area

- 0-1mm/h : v6 > v7
- 1-7,8mm/h : v6 < v7
- 7, 8mm/h- 30mm/h: v6 > v7



Summary (Case 2)

Comparisons of annual rainfall amount in 2008 and 2009.
V6 vs.V7(ITE225)

- Large differences are not seen between V6 and V7 ($0.5^o \times 0.5^o$)
- Rainfall amounts in 2008 and 2009 decrease in the wide area.
- Intensity categories increase and decrease in v7.
    - 0-1mm/h：v6 > v7
    - 1-7,8mm/h：v6 < v7
    - 7, 8mm/h- 30mm/h: v6 > v7

Conclusion

Rainfall amounts over the west Japan (the wide area) decrease from V6 to V7 (ITE225 or OAT7). It causes large differences between PR and AMeDAS rainfalls. However, differences improved a little in light rain areas and months.