

## RINEX ver3-base QZSS Extension (Version 1.00)

Hiroaki Tateshita/Shinichi Nakamura Japan Aerospace Exploration Agency



## Introduction

Basically, new RINEX is based on "RINEX version 3.01" (17 December 2010)

In this presentation, only modification points are described.

JAXA has proposed this RINEX format QZSS Extension to IGS. JAXA hopes this format will become a de fact standard and will be integrated to original RINEX format published by IGS. When this format is integrated to the original RINEX format and published on the IGS website, this format will be abolished.

#### **OZSS RINEX**

#### Modification Points (P.5 on RINEX Format)



#### 3.5 Satellite numbers

Starting with RINEX Version 2 the former two-digit satellite numbers **nn** are preceded by a one-character system identifier **s**:

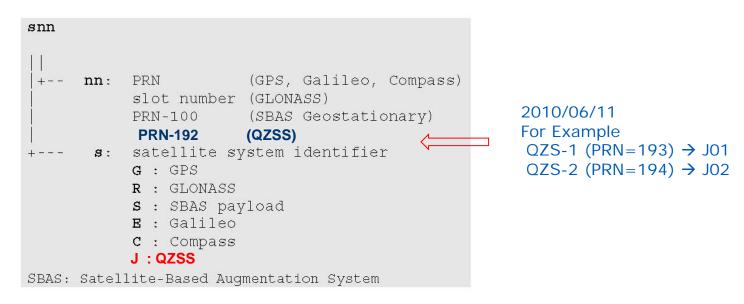


Table 1: Satellite numbers

The same satellite system identifiers are also used in all header records when appropriate.

## Modification Points (P.5 on RINEX Format)

#### 4. THE EXCHANGE OF RINEX FILES:

We recommend using the following naming convention for RINEX files:

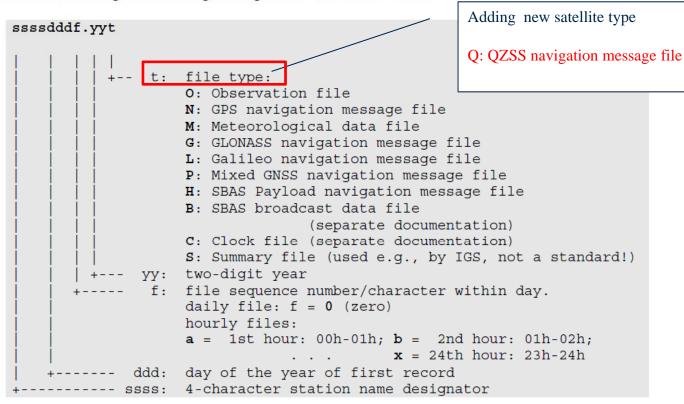


Table 2: Recommended filenames: General, daily, hourly files





File Types	All platforms uncompressed	UNIX	VMS compressed	DOS
Obs Files	.yyO	.yyO.Z	.yyO_Z	.yyY
Obs Files (Hatanaka Compressed)	.yyD	.yyD.Z	.yyD_Z	.yyE
GPS NAV Message File	.yyN	.yyN.Z	.yyN_Z	.yyX
GLONASS Nav Message File	.yyG	.yyG.Z	.yyG_Z	.yyV
~	~	~	~	~
Clock File (see sep.doc.)	.yyC	.yyC.Z	.yyC_Z	.yyW
QZSS Nav Message File	.yyQ	.yyQ.Z	.yyQ_Z	.yyJ

#### RINEXファイル名(P.8)





System	System Freq. Frequenc Band y		Channel or Code	Observation Codes				
				Pseudo Range	Carrier Phase	Doppler	Signal Strength	
QZSS L1	1575.42	C/A	C1C	L1C	D1C	S1C		
			L1C(D)	C1S	L1S	D1S	S1S	
			L1C(P)	C1L	L1L	D1L	S1L	⇔Pilot Ch.
			L1C(D+P)	C1X	L1X	D1X	S1X	
	L2	1277.60	L2C(M)	C2S	L2S	D2S	S2S	□ Data ch.
			L2C(L)	C2L	L2L	D2L	S2L	
			L2C(M+L)	C2X	L2X	D2X	S2X	
	L5 1	1176.45	I	C5I	L5I	D5I	S5I	
			Q	C5Q	L5Q	D5Q	S5Q	
			I+Q C5X	C5X	L5X	D5X	S5X	
LEX	1278.75	S	C6S	L6S	D6S	S6S	□ Data ch.	
			L	C6L	L6L	D6L	S6L	
			S+L	C6X	L6X	D6X	S6X	

## QZSS RINEX Modification Points (P.8 on RINEX Format )



**QZSS**–pseudorandom noise (PRN) code assignments:

See e.g., <a href="http://www.losangeles.af.mil/library/factsheets/factsheet.asp?id=8618">http://www.losangeles.af.mil/library/factsheets/factsheet.asp?id=8618</a>

## Modification Points (P.17)



#### 8.1 Time system identifier

(Insert new sentence after GPS description)

QZSS runs on QZSST, which has the following characteristics. QZSST confirms to UTC (NICT) and the offset with respect to the GPS time system is controlled.

- One second length
  The length of one second is identical to International Atomic Time (TAI). It is also
  the same for GPS and Galileo.
- •Integer second offset for TAI The integer second offset for TAI is the same as for GPS. TAI is always 19 seconds ahead of QZSST.
- •Starting point of Week Number for QZSST

  The starting point of the Week Number for QZST is identical to GPST.

## QZSS RINEX Modification Points (P.18)



#### 8.2 Pseudorange definition

(At 2<sup>nd</sup> paragraph)

In a mixed-mode GPS/GLONASS/Galileo/QZSS reciever referring all pseudorange observations to one reciever clock only,



## Modification Points (P.A1)

#### A 1 GNSS Observation Data File - Header Section Description

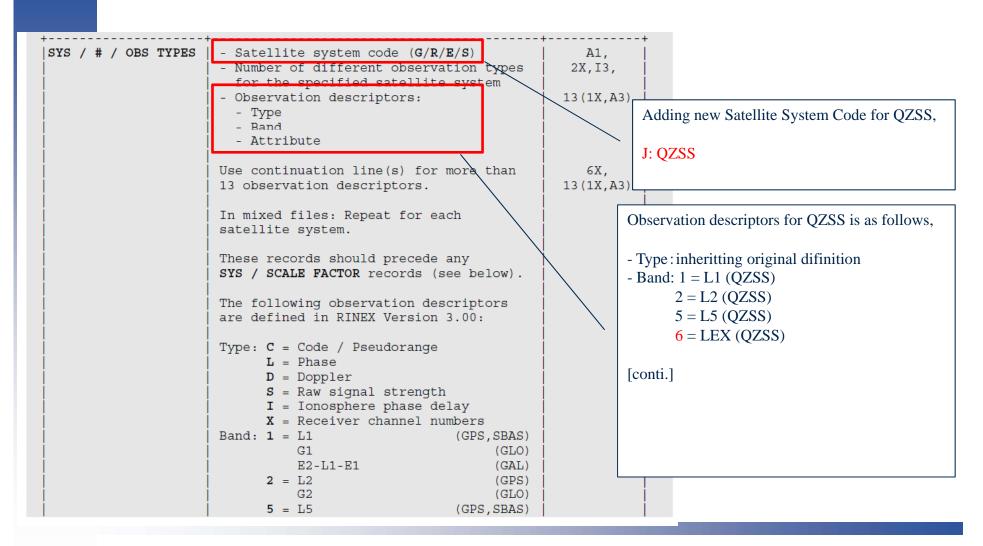
TABLE A1 GNSS OBSERVATION DATA FILE - HEADER SECTION DESCRIPTION			
HEADER LABEL (Columns 61-80)	DESCRIPTION	FORMAT	
RINEX VERSION / TYPE	- Format version : 3.00 - File type: O for Observation Data - Satellite System: G: GPS R: GLONASS E: Galileo S: SBAS payload M: Mixed	F9.2,11X, A1,19X, A1,19X	
PGM / RUN BY / DATE	l - Name of program creating current file	A20.	

Adding new Satellite System indicator for QZSS,

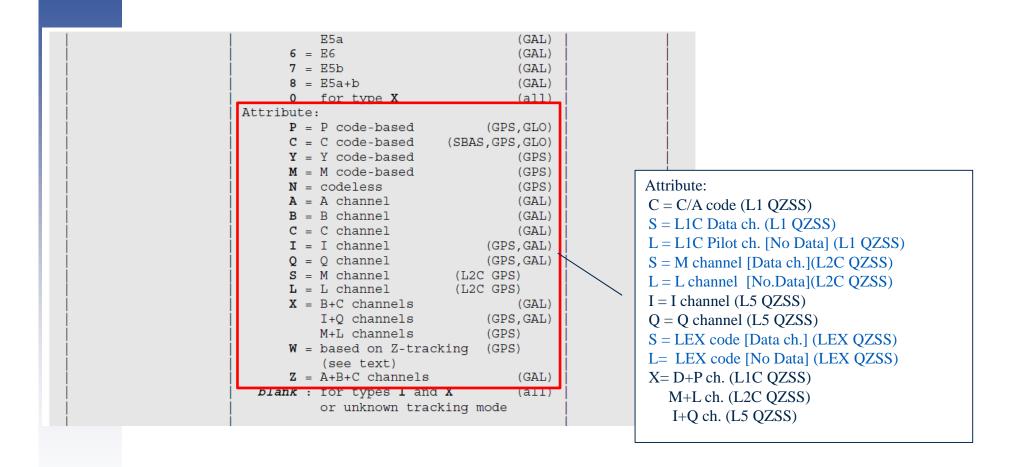
J: QZSS



## Modification Points (P.A2)



### Modification Points (P.A3 on RINEX Format



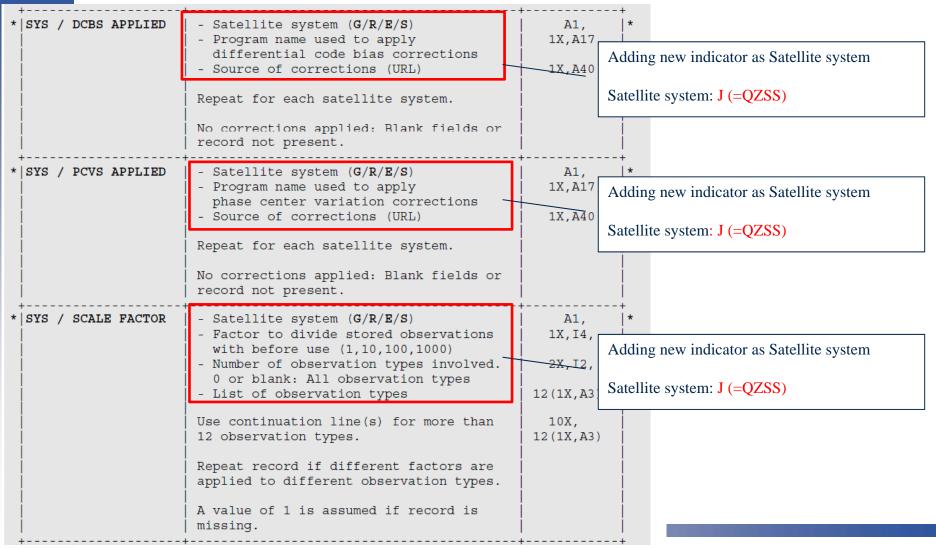


# RINEX Observation Data File (P.A3)

Time of first observation record 5I6,F13.7, TIME OF FIRST OBS (4-digit-year, month, day, hour, min, sec) Time system: GPS (=GPS time system) 5X,A3 GLO (=UTC time system) GAL (=Galileo System Time) Adding new Time system for QZSS Compulsory in mixed GNSS files Defaults: GPS for pure GPS files GLO for pure GLONASS files Time system: QZS (=QZSS time system) GAL for pure Galileo files



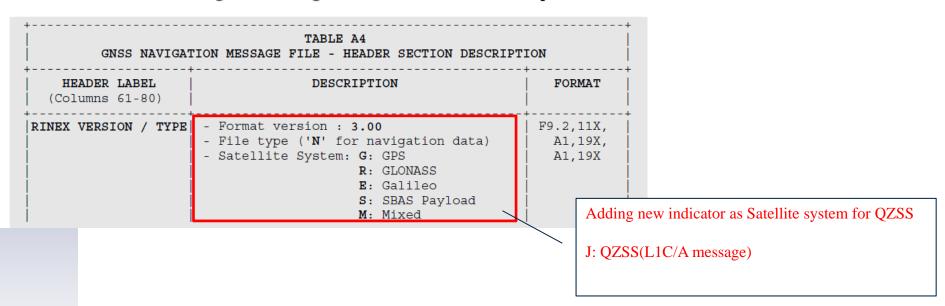
## RINEX Observation Data File (P.A4)





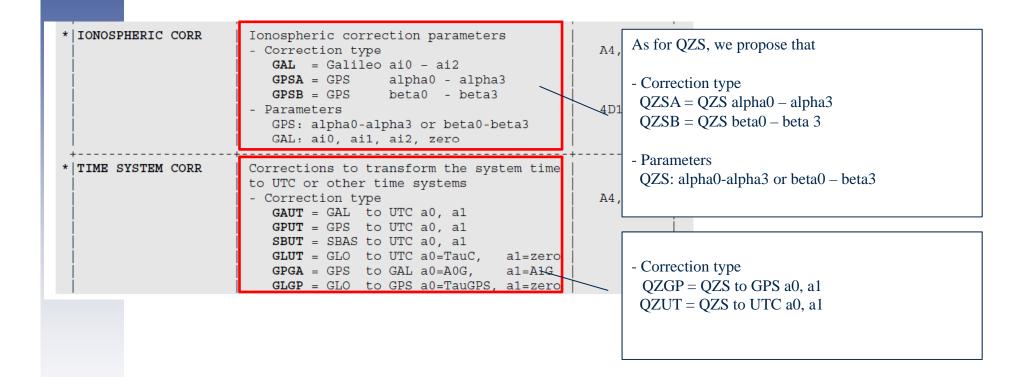
## Modification Points (P.A8)

#### A 4 GNSS Navigation Message File - Header Section Description





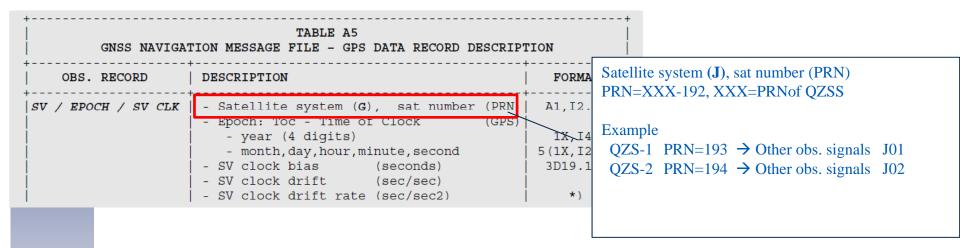
## Modification Points (P.A8)





### Modification Points (P.A9)

#### A 5 GNSS Navigation Message File – GPS Data Record Description



#### Note that

PRN number run from 193 to 210 for QZSS other observation signals.

JAXA's idea is PRN-192 rule for all QZSS L1,L2 and L5. According to this rule,

QZS-1's (PRN=193) signals are expressed by J01.



## Modification Points (P.A13)

#### A 11 GNSS Navigation Message File - SBAS Data Record Description

