

OResults of Radioactive Material Monitoring of Aquatic Organisms (Locations A and B along the Abukuma River)

<Locations A and B along the Abukuma River: Samples collected>

Locations	General items		Radioactive materials			
	Water	Sediment	Water (Cs)	Water (Sr)	Sediment (Cs)	Sediment (Sr)
A-1	○	○	○	○	○	○
A-2	○	○	○	-	○	-
B-1	○	○	○	-	○	-
B-2	○	○	○	-	○	-
B-3	○	○	○	-	○	-

<Locations A and B along the Abukuma River: Site measurement item>

Locations	Latitude and longitude of the location		Survey date and time			Water	Sediment				Other	
	Latitude	Longitude	Date	Time (water)	Time (sediment)	Water temperature (degrees C)	Sediment temperature (degrees C)	Property	Color	Contaminants	Water depth (m)	Transparency (cm)
A-1(Surface layer)	37.6210°	140.5218°	2016/10/17	08:50	09:20	15.6	15.8	Sand with silt	2.5Y3/1	None	7.10	>50 (2.0m)*
A-1(Bottom layer)				08:48		15.5						
A-2	37.5673°	140.3946°		11:20	11:35	14.8	16.5	Sand with gravel	2.5Y4/3	None	0.86	48
B-1	37.7843°	140.4924°		13:55	14:20	16.5	17.3	Silt with sand	2.5Y4/2	None	0.33	>50
B-2	37.8121°	140.5058°		16:12	16:20	16.5	17.5	Sand	2.5Y4/3	None	0.60	>50
B-3	37.8182°	140.4679°		15:13	15:25	16.4	16.7	Sand with gravel	2.5Y4/2	None	0.50	>50

* The number in parentheses indicates Secchi disk depth.

<Locations A and B along the Abukuma River: General survey items/Analysis of radioactive materials Water>

Locations	Latitude and longitude of the location		Survey date and time		pH	BOD (mg/L)	COD (mg/L)	DO (mg/L)	Electric conductivity (mS/m)	Salinity	TOC (mg/L)	SS (mg/L)	Turbidity (FNU)	Cs-134 (Bq/L)	Cs-137 (Bq/L)	Sr-90 (Bq/L)
	Latitude	Longitude	Date	Time (water)												
A-1(Surface layer)	37.6210°	140.5218°	2016/10/17	08:50	7.5	1.5	3.4	10.1	17.5	0.10	1.4	4	2.1	0.0016	0.0080	0.0010
A-1(Bottom layer)				08:48	7.5	1.4	3.4	10.2	17.6	0.09	1.4	3	2.5	0.0073	0.042	-
A-2	37.5673°	140.3946°		11:20	7.7	0.9	3.1	10.6	10.1	0.06	1.3	4	2.8	0.0054	0.029	-
B-1	37.7843°	140.4924°		13:55	7.9	1.0	3.0	11.6	18.6	0.10	1.4	5	2.9	0.0038	0.023	-
B-2	37.8121°	140.5058°		16:12	7.8	0.8	3.0	10.9	15.9	0.09	1.3	4	2.7	0.0016	0.0090	-
B-3	37.8182°	140.4679°		15:13	7.7	0.7	3.5	10.2	8.3	0.04	1.5	3	3.3	0.0013	0.0065	-

<Locations A and B along the Abukuma River: General survey items/Analysis of radioactive materials Sediment>

Locations	Latitude and longitude of the location		Survey date and time		pH	Redox potential E _{NHE} (mV)	Water content (%)	IL (%)	TOC (mg/g-dry)	Soil particle density (g/cm ³)	Grain size distribution								Cs-134 (Bq/kg-dry)	Cs-137 (Bq/kg-dry)	Sr-90 (Bq/kg-dry)
	Latitude	Longitude	Date	Time (sediment)							Gravel (2-75mm) (%)	Coarse sand (0.85-2mm) (%)	Medium sand (0.25-0.85mm) (%)	Fine sand (0.075-0.25mm) (%)	Silt (0.005-0.075mm) (%)	Clay (Less than 0.005mm) (%)	Median grain diameter (mm)	Maximum grain diameter (mm)			
A-1	37.6210°	140.5218°	2016/10/17	09:20	7.3	81	58.4	10.1	37.7	2.608	0.0	0.1	1.2	15.7	48.8	34.2	0.013	2.0	110	570	0.55
A-2	37.5673°	140.3946°		11:35	7.1	337	19.8	1.8	3.6	2.760	34.5	39.8	19.6	3.9	1.2	1.0	1.5	9.5	28	220	-
B-1	37.7843°	140.4924°		14:20	7.4	334	30.8	3.1	9.1	2.720	18.1	6.3	29.7	39.2	3.5	3.2	0.27	9.5	41	250	-
B-2	37.8121°	140.5058°		16:20	7.3	328	29.2	1.6	2.0	2.731	0.0	0.6	71.6	25.9	0.9	1.0	0.32	4.8	22	170	-
B-3	37.8182°	140.4679°		15:25	7.3	326	16.6	1.2	1.7	2.703	41.8	31.5	23.3	2.2	0.6	0.6	1.6	9.5	20	99	-

<Locations A and B along the Abukuma River: Analysis items Aquatic organisms>

Locations	Sampling point	Latitude and longitude of the location		Sampling date	Division	Class	Order	Family	Scientific name	English name	Population	Sample weight (kg-wet)	Note			Radioactive cesium (Bq/kg-wet)			Sr-90 (Bq/kg-wet)		
		Latitude	Longitude										Growth stage	Stomach contents	Measurement site	Total	Cs-134	Cs-137			
A-2	Harase River	37.5673°	140.3946°	2016/10/23	Algae/plant	-	-	-	-	Riverbed Deposits (Include algae)	-	0.024	-	-	-	201	31	170	-		
					Arthropoda	Insecta	Odonata	Corduliidae	<i>Macromia amphigena amphigena</i>	Macromia amphigena	60	0.051	Larva (Dragonfly larva)	-	-	-	-	-	-	-	-
					Arthropoda	Insecta	Odonata	Cordulegastridae	<i>Anotogaster sieboldii</i>	Anotogaster sieboldii											
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Onychogomphus viridicostus</i>	Melligomphus viridicostus											
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Sieboldius albardae</i>	Sieboldius albardae											
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Asiagomphus melaenops</i>	Asiagomphus melaenops											
					Arthropoda	Malacostraca	Decapoda	Atyidae	<i>Neocaridina sp.</i>	Neocaridina	430	0.045	Imago	-	-	-	19.4	3.4	16	-	
					Mollusca	Gastropoda	Discopoda	Pleuroceridae	<i>Semisulcospira libertina</i>	Semisulcospira libertina	30	0.027	Imago	-	Molluscos part	-	15.7	2.7	13	-	
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Phoxinus lagowskii steindachneri</i>	Amur Minnow	26	0.13	Immature fish, Mature fish	-	-	-	15.4	2.4	13	-	
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Tribolodon hakonensis</i>	Japanese dace	1	0.0031	Immature fish	-	-	-	10	N.D.(9.8)	10	-	
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Zacco platypus</i>	Pale chub	4	0.024	Immature fish	-	-	-	16.2	3.2	13	-	
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Nipponocypris temminckii</i>	Dark chub	18	0.13	Immature fish, Mature fish	-	-	-	14.3	2.3	12	-	
					Vertebrata	Osteichthyes	Cypriniformes	Cobitidae	<i>Misgurnus anguillicaudatus</i>	Oriental weatherfish	32	0.062	Immature fish, Mature fish	-	-	-	10.3	1.2	9.1	-	
					Vertebrata	Amphibia	Anura	-	-	Frog	28	0.018	Larva (Tadpole)	-	-	-	135	15	120	-	
					Vertebrata	Amphibia	Anura	Ranidae	<i>Rana rugosa</i>	Wrinkled Frog	4	0.031	Imago	-	-	-	41.0	6.0	35	-	
					Vertebrata	Amphibia	Anura	Ranidae	<i>Rana japonica</i>	Japanese Brown Frog											
					Vertebrata	Amphibia	Caudata	Salamandridae	<i>Cynops pyrrhogaster</i>	Cynops pyrrhogaster	4	0.028	Imago	-	-	-	3.5	N.D.(1.5)	3.5	-	
				Particulate Organic Matter	-	-	-	-	Bottom fallen leaves	-	-	0.20	-	-	-	16.5	2.5	14	-		
B-2	The main stream of the Abukuma River	37.8121°	140.5058°	2016/10/1	Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Tribolodon hakonensis</i>	Japanese dace	2	0.45	Mature fish	Amorphous Residue	Viscera removed	14.0	2.0	12	-		
				2016/10/3	Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Hemibarbus barbus</i>	Hemibarbus barbus	3	4.2	Mature fish	Empty stomach	Viscera removed	9.7	1.6	8.1	-		
				2016/9/29	Vertebrata	Osteichthyes	Salmoniformes	Osmoridae	<i>Plecoglossus altivelis</i>	Sweetfish	42	2.0	Mature fish	-	-	32.5	4.5	28	0.21		
				2016/10/2	Vertebrata	Osteichthyes	Salmoniformes	Salmonidae	<i>Oncorhynchus keta</i>	Salmon	1	2.4	Mature fish	Empty stomach	Viscera removed	N.D.	N.D.(0.29)	N.D.(0.29)	-		
B-3	Surikami River	37.8182°	140.4679°	2016/10/23	Algae/plant	-	-	-	-	Riverbed Deposits (Include algae)	-	0.028	-	-	-	113	13	100	-		
					Arthropoda	Insecta	Trichoptera	Stenopsychidae	<i>Stenopsyche marmorata</i>	Stenopsyche marmorata	193	0.029	Larva	-	-	-	20.7	2.7	18	-	
					Arthropoda	Insecta	Odonata	Corduliidae	<i>Macromia amphigena amphigena</i>	Macromia amphigena	118	0.043	Larva (Dragonfly larva)	-	-	-	-	-	-	-	-
					Arthropoda	Insecta	Odonata	Cordulegastridae	<i>Anotogaster sieboldii</i>	Anotogaster sieboldii											
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Nihonogomphus viridis</i>	Nihonogomphus viridis											
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Onychogomphus viridicostus</i>	Melligomphus viridicostus											
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Sieboldius albardae</i>	Sieboldius albardae											
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Davidius sp.</i>	Davidius											
					Arthropoda	Insecta	Odonata	Aeshnidae	<i>Anax parthenope</i>	Anax parthenope											
					Arthropoda	Malacostraca	Decapoda	Cambaridae	<i>Procambarus clarkii</i>	Red swamp crawfish	3	0.030	Imago	-	-	-	5.9	N.D.(1.6)	5.9	-	
					Vertebrata	Osteichthyes	Scorpaeniformes	Cottidae	<i>Cottus pollux</i>	Japanese fluvial sculpin	12	0.18	Immature fish	-	-	-	4.55	0.85	3.7	-	
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Phoxinus lagowskii steindachneri</i>	Amur Minnow	13	0.075	Immature fish, Mature fish	-	-	-	4.79	0.69	4.1	-	
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Tribolodon hakonensis</i>	Japanese dace	5	0.049	Immature fish	-	-	-	6.5	1.2	5.3	-	
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Nipponocypris temminckii</i>	Dark chub	17	0.11	Immature fish, Mature fish	-	-	-	7.8	1.3	6.5	-	
					Vertebrata	Osteichthyes	Cypriniformes	Cobitidae	<i>Misgurnus anguillicaudatus</i>	Oriental weatherfish	14	0.039	Immature fish, Mature fish	-	-	-	8.9	1.3	7.6	-	
					Vertebrata	Osteichthyes	Cypriniformes	Cobitidae	<i>Noemacheilus barbatulus</i>	Stone loach	13	0.20	Immature fish	-	-	-	3.72	0.52	3.2	-	
					Vertebrata	Osteichthyes	Perciformes	Gobiidae	<i>Rhinogobius fluviatilis</i>	Rhinogobius fluviatilis	1	0.0092	Mature fish	-	-	-	12	N.D.(4.1)	12	-	
Vertebrata	Amphibia	Anura	-	-	Frog	27	0.036	Larva (Tadpole)	-	-	-	46.0	6.0	40	-						
				Particulate Organic Matter	-	-	-	-	Bottom fallen leaves	-	-	0.30	-	-	-	37.0	6.0	31	-		

*1: Organisms were collected in or around the targeted water areas.

*2: When multiple types of aquatic organisms were collected, a sample was prepared by mixing them.

*3: For a sample made of multiple types of aquatic organisms, the English name of the dominant one largest in number is underlined.

*4: Basically, measurement was conducted for all organism samples. Viscera (stomach and bowels) were removed for the measurement when possible so that undigested food and sediments, etc. in the digestive system would be excluded.

*5: Plankton (suspended algae) is the residue remaining after the filtration of lake water or seawater with a plankton net (40µm-mesh).

*6: River bottom materials (incl. algae) are algae, etc. that were scratched off stones with a brush, etc. and may include very fine particles such as inorganic silt and clay.

*7: N.D. means to be below the detection limit and figures in parentheses show the detection limit.

*8: Activity concentrations include counting errors, but the details are omitted here.