

## 2022/2023 Annual Cruise Report of the *T/V Nansei-maru*

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### Abstract

To facilitate the effective use of *T/V Nansei-maru*, we will report on the annual activities of the vessel from April 2022 to March 2023. Sixty-nine (69) cruises were conducted by *T/V Nansei-maru*. The total number of cruise days was 138 days (105 days of training voyage, 1 day Freshman seminar, 6 days of typhoon evacuation voyage, and 26 days of regular inspection) and the number of participants was 549 persons.

### Introduction

*T/V Nansei-maru* was constructed in 2002 for the purpose of conducting practical training and observations of navigation, fishing vessel operation, fisheries, marine environment observations, and resource biology surveys. *T/V Nansei-maru* is based at the Ogawa Pier in Kagoshima Port. Its activities are conducted in areas that cover Kagoshima Bay, the Satsuma-Osumi Peninsula coasts, and the archipelagic waters in Kagoshima Prefecture, including Tanegashima, Yakushima, Tokara Islands, and the Koshiki Islands.

### Specifications of the main shipboard instruments

This section provides general information on specifications of the main shipboard instruments employed during oceanographic observations and sample collections.

Conductivity-Temperature-Depth Profiler System with a 12-position Carousel Multiple Sampler (CTD-CMS) is used for hydrographic observations using the sensors for conductivity, temperature, pressure (SBE 19plus: Sea-Bird Electronics, Inc.) and altimeter (Benthos PSA-916D: Teledyne Benthos, Inc.). Niskin bottles (2.5L) are attached with CMS for collecting depth-stratified water samples.

For monitoring bathymetry and underwater substrates, *T/V Nansei-maru* has two different sonar instruments, first and Acoustic Doppler Current Profiler (Ocean Surveyor ADCP: Teledyne-RD Instruments, Inc.) and second a Scientific Echo

Sounder (KFC3000: KAIJO). Available working frequencies are 75 kHz for the Acoustic Doppler Current Profiler (ADCP) and 38 and 120 kHz for the Scientific Echo Sounder (SES). ADCP and SES are used for measuring water current velocities over a certain depth range and for monitoring bathymetry and underwater substrate classification, respectively.

A North Pacific Standard (NORPAC) net is used for collecting zooplankton samples. The mouth diameter is 0.45 m, and its mesh openings are 0.1 mm. A flowmeter (Rigo Co., Ltd) is mounted in the mouth of the frame of the net to register the volume of water that has passed through it.

An Ocean Research Institute (ORI) net is employed for collecting zooplankton and fish larvae samples. The mouth diameter is 0.45 m, and its mesh openings are 0.335 mm. A flowmeter (Rigo Co., Ltd) is also mounted in the mouth to register the volume of water that passed through it.

Core, Dredge and Grab samplers are used for collecting bottom mud and benthic organisms. The Core sampler is a G.S. type Core sampler (ASYURA) (Rigo Co., Ltd). The Grab sampler is a Smith-Mcintyre bottom sampler (Rigo Co., Ltd). The Grab and core samplers are deployed from the port-side of the vessel located on the working deck. We use a Niino-type Dredge sampler (Rigo Co., Ltd), which is obliquely towed from the afterdeck.

A Larva Catch (LC) net is a large-scale fishing gear that can

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be used in the permitted water areas. Instead of otter boards (expansion boards) at the mouth of the net, it is equipped with a parakite (kite) that is used to widen the mouth of the net through its resistance during trawling. The ramp door on the stern deck of the ship is opened to deploy this trawl net.

### Overview of cruises

*T/V Nansei-maru* conducted 69 cruises from April 2022 to March 2023 (Table 1). Total number of the cruise days was 138 days and the number of participants was 549 persons. In the fiscal year 2022, *T/V Nansei-maru* navigated from Kagoshima Bay to the vicinity of the Tokara Islands Nakano Island (Fig.1).

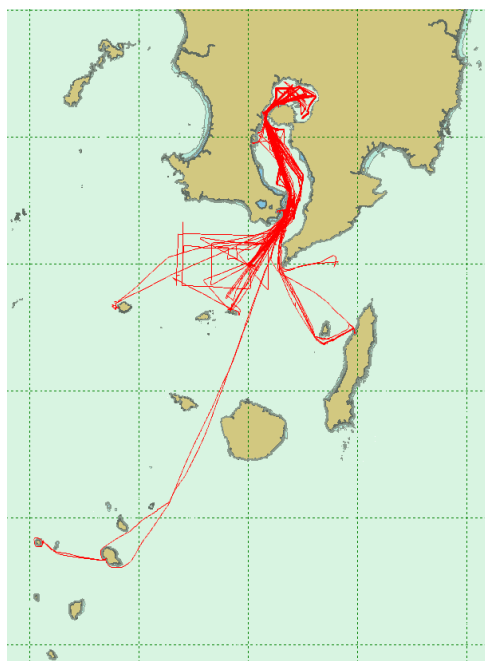


Fig. 1. Cruise tracks of *T/V Nansei-maru* during April 2022 to March 2023. Process and create electronic navigational charts (newpec) using the Japan Hydrographic Association's data.

*T/V Nansei-maru* conducted 3 cruises from February to April 2023 for evaluating the spatial distributions of floating algae found around the northern Satsunan area, southern Kyushu. The purpose was to identify yellowtail juveniles (*Seriola quinqueradiata*) following these floating algae. The juveniles are captured and used as natural nursery stocks of mariculture in Japan. Our Faculty of Fisheries, Kagoshima University, provides the information of these research cruises to local fishers. The information is available from the following websites:

<https://www.fish.kagoshima-u.ac.jp/aqua/topics/>

<https://nagaremo.fish.kagoshima-u.ac.jp/>

The other faculties and universities included in other person are as follows.

- Graduate School of Science and Engineering Kagoshima University
- Faculty of Science Kagoshima University
- Tokyo University of Marine Science and Technology
- Nihon University
- Osaka Metropolitan University
- Prefectural University of Kumamoto

### Lists of publications

This section provides information on published articles relating to the observations carried out using *T/V Nansei-maru* in the period from April 2022 to March 2023.

- Manako, Y., T. Kobari, G. Kume, F. Hyodo, M. Noguchi-Aita, M. Ichinomiya, T. Komorita, R. Kawabe, I. Nakamura, K. Komeyama, H. Tsuchida (2022): Prey of whale shark visited in the northern Satsunan area. *Bull. Plankton Soc. Japan*, **69**: 1–7.
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- Nawer F, W. Doi and J. Ohtomi (2022): Oocyte and embryonic development, size at sexual maturity, and spawning season of *Charybdis bimaculata*. *Fish. Sci.*, **88**: 449–459.
- Nawer F, W. Doi and J. Ohtomi (2023): Recruitment and growth patterns of the portunid crab *Charybdis bimaculata* in Kagoshima Bay, southern Japan. *Fish. Sci.*, **89**: 223–232.
- Ohtomi, J., K. Hirowatari, M. M. Rahman, L. Havimana and Y. Masuda (2022): First report on reproductive features of shadow driftfish *Cubiceps whiteleggii* (Perciformes:

Table 1. Cruise information on *T/V Nansei-maru* during April 2022 to March 2023.

Cruise ID	Period			Number of persons			Major objectives
	Start	End	Days	SC/PR*	ST*	OP*	
NS22- 1	Apr 03	Apr 07	5	2	6		Hydrographic observation and Biological sample collection
NS22- 2	Apr 12	Apr 12	1	1	4		Hydrographic observation
NS22- 3	Apr 14	Apr 14	1	2	1	6	Hydrographic observation
NS22- 4	Apr 18	Apr 18	1	1	6		Fishing gear operation and Resource Survey
NS22- 5	Apr 22	Apr 22	1	1	6		Fishing gear operation and Resource Survey
NS22- 6	Apr 27	Apr 29	3		9	1	Biological sample collection
NS22- 7	May 12	May 12	1	1	1	3	Hydrographic observation
NS22- 8	May 15	May 16	2	1	4		Hydrographic observation and Biological sample collection
NS22- 9	May 20	May 20	1	2	5		Fishing gear operation and Resource Survey
NS22- 10	May 23	May 23	1	2	6		Fishing gear operation and Resource Survey
NS22- 11	May 25	May 25	1	1	7		Hydrographic observation
NS22- 12	May 26	May 29	4	2	6		Biological sample collection
NS22- 13	Jun 01	Jun 01	1	2	7		Hydrographic observation
NS22- 14	Jun 04	Jun 05	2	1	5		Hydrographic observation and Biological sample collection
NS22- 15	Jun 20	Jun 20	1	2	5	3	Fishing gear operation and Resource Survey
NS22- 16	Jun 22	Jun 22	1	2	8		Fishing gear operation and Resource Survey
NS22- 17	Jun 23	Jun 24	2	2	2	6	Biological sample collection
NS22- 18	Jun 26	Jun 27	2	1	4	5	Hydrographic observation
NS22- 19	Jun 30	Jun 30	1	2	2	3	Underwater equipment recovery
NS22- 20	Jul 06	Jul 10	5	2	10		Hydrographic observation and Biological sample collection
NS22- 21	Jul 11	Jul 11	1	2	1	6	Hydrographic observation
NS22- 22	Jul 12	Jul 12	1	1	5		Hydrographic observation
NS22- 23	Jul 15	Jul 15	1	1	5		Fishing gear operation and Resource Survey
NS22- 24	Jul 21	Jul 21	1	1	3	2	Equipment underwater test
NS22- 25	Jul 22	Jul 22	1	1	5		Fishing gear operation and Resource Survey
NS22- 26	Jul 25	Jul 25	1	1	3		Equipment underwater test
NS22- 27	Aug 04	Aug 06	3	2	5		Biological sample collection
NS22- 28	Aug 08	Aug 08	1		4		Hydrographic observation
NS22- 29	Aug 17	Aug 17	1	2	2	4	Hydrographic observation
NS22- 30	Aug 22	Aug 23	2	1	5		Maneuverability test and Equipment underwater test
NS22- 31	Aug 24	Aug 24	1	1	6		Fishing gear operation and Resource Survey
NS22- 32	Aug 26	Aug 27	2	2	5	1	Hydrographic observation and Biological sample collection
NS22- 33	Sep 05	Sep 06	2				Typhoon evacuation
NS22- 34	Sep 12	Sep 12	1	1	2		Hydrographic observation
NS22- 35	Sep 16	Sep 19	4				Typhoon evacuation
NS22- 36	Sep 20	Sep 20	1	1	8	1	Fishing gear operation and Resource Survey
NS22- 37	Sep 22	Sep 22	1	1	6	3	Fishing gear operation and Resource Survey
NS22- 38	Sep 24	Sep 25	2	1	2	3	Biological sample collection
NS22- 39	Sep 28	Sep 29	2	1	6		Hydrographic observation and Biological sample collection
NS22- 40	Oct 05	Oct 05	1	1	4		Hydrographic observation
NS22- 41	Oct 12	Oct 13	2	1	5		Biological sample collection
NS22- 42	Oct 14	Oct 16	3		6	2	Biological sample collection
NS22- 43	Oct 17	Oct 17	1	2	3	6	Hydrographic observation
NS22- 44	Oct 20	Oct 20	1	1	7		Fishing gear operation and Resource Survey
NS22- 45	Oct 21	Oct 21	1	1	7		Fishing gear operation and Resource Survey
NS22- 46	Nov 21	Nov 21	1	1	7		Fishing gear operation and Resource Survey
NS22- 47	Nov 22	Nov 22	1	2	13	1	Biological sample collection
NS22- 48	Nov 24	Nov 25	2		2	4	Fishing gear operation and Resource Survey
NS22- 49	Dec 12	Dec 12	1	1	4		Hydrographic observation
NS22- 50	Dec 14	Dec 14	1	1	2	6	Hydrographic observation
NS22- 51	Dec 16	Dec 18	3	1	15	16	Hydrographic observation and Biological sample collection
NS22- 52	Dec 20	Dec 20	1	1	7		Fishing gear operation and Resource Survey
NS22- 53	Dec 21	Dec 22	2	1	3	4	Equipment underwater test and Fishing gear operation
NS22- 54	Dec 26	Dec 26	1	2	5		Hydrographic observation and Biological sample collection
NS22- 55	Jan 12	Jan 12	1	1	4		Hydrographic observation
NS22- 56	Jan 16	Jan 16	1	2	7		Fishing gear operation and Resource Survey
NS22- 57	Feb 02	Feb 02	1	1	5		Equipment underwater test
NS22- 58	Feb 03	Feb 03	1	2	7		Fishing gear operation and Resource Survey
NS22- 59	Feb 08	Feb 08	1	1	2		Hydrographic observation
NS22- 60	Feb 13	Feb 15	3	1	7		Hydrographic observation and Biological sample collection
NS22- 61	Feb 16	Feb 16	1	2	8		Fishing gear operation and Resource Survey
NS22- 62	Feb 20	Feb 20	1	2	6	1	Hydrographic observation
NS22- 63	Feb 22	Feb 24	3	1	7		Hydrographic observation and Biological sample collection
NS22- 64	Feb 27	Feb 27	1	2	1	12	Hydrographic observation
NS22- 65	Mar 02	Mar 02	1	3	2	3	Underwater equipment installation
NS22- 66	Mar 13	Mar 13	1	2	10		Hydrographic observation
NS22- 67	Mar 14	Mar 14	1	1	7		Fishing gear operation and Resource Survey
NS22- 68	Mar 15	Mar 19	5	2	6		Hydrographic observation and Biological sample collection
NS22- 69	Mar 22	Mar 22	1	1	11		Hydrographic observation
	Apr 23	Apr 23	1				Freshman seminar (Onboard tour)
	Oct 25	Nov 19	26				Periodic Ship Inspections

\* SC/PR: Scientist/Professor, ST: Student, OP: Other person

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