

Evaluation of Operating Results for Japan Agency
for Marine-Earth Science and Technology
Estimated at the End of the 3rd Mid to long-Term
Objective Period

August 2018

Minister of Education, Culture, Sports, Science and Technology

1. Items related to the evaluation		
Agency	Japan Agency for Marine-Earth Science and Technology	
FY for evaluation	FY evaluation	The 3rd mid to long-term objective period (including the estimated operating results in the final fiscal year)
	Mid to long-term objective period	FY2014-FY2018

2. Items related to the assessor			
The Competent Minister	Minister of Education, Culture, Sports, Science and Technology		
Incorporated jurisdiction dept.	Research and Development Bureau	Dept. and person in charge	Ocean and Earth Division, Takayuki Aso
Evaluation and inspection dept.	Science and Technology Policy Bureau	Dept. and person in charge	Planning and Evaluation Division, Keiji Inoue

3. Items regarding implementation of evaluation
<p>In the evaluation of operating results in FY2017 and prospective operating results at the end of the 3rd mid-term objective period, Sub-Committee on the Japan Agency for Marine-Earth Science and Technology (hereinafter referred to as the “Sub-Committee”) of the National Research and Development Agency Council under the Ministry of Education, Culture, Sports, Science and Technology was held three times and took the following actions:</p> <p>May 30, 2018: The Sub-Committee (12th) discussed procedures of evaluation of business performance, etc. at the sub-committee held in FY2018, and heard opinions from the sub-committee members.</p> <p>July 3, 2018: The Sub-Committee (13th) held hearings with the president, and executive directors in charge about the results of self-evaluation on the prospective business performance of the Japan Agency for Marine-Earth Science and Technology (hereinafter referred to as “JAMSTEC”) in FY2017 and at the end of the 3rd mid-term objective period, and heard opinions from the sub-committee members.</p> <p>July 25, 2018; The Sub-Committee (14th) received advice based on scientific knowledge from the sub-committee members regarding the competent minister’s evaluation document (draft).</p> <p>August 22, 2018: The National Research and Development Agency Council (12th) under MEXT received advice based on scientific knowledge from the council members regarding procedures of evaluation by the competent minister.</p>

4. Important items and others relating to the evaluation
<p>○ <u>Classification of evaluation items on management into major categories</u></p> <p>In the evaluation of business performance, etc. in FY2017, evaluation items on management (including those in II. Items concerning the efficiency of the administration of the operations, III. Items regarding improvements in financial related matters, and IV. Other items) will be classified into major categories according to the items for mid-term objectives and in line with the large classification and simplification, etc. of evaluation items on similar operations, pointed out at a sub-committee last year^(*).</p> <p>Accordingly, consideration is made for the evaluation items on business management in the evaluation of the agency by the competent minister that these items are reviewed or inspected with a focus on important matters such as the agency’s internal control or governance, and noteworthy efforts in management for maximizing R&D achievements or issues on business operations that cannot be left unaddressed, to allow the agency to organize an efficient organization and business operations for maximizing R&D achievement.</p> <p>(*) Excerpts from matters pointed out at the sub-committee last fiscal year</p> <p>○ At present, a large number of items are evaluated for a short period of time in the evaluation of agency every fiscal year. <u>Scrutiny of evaluation items for similar operations, such as classification into major categories and simplification of items, and simplification and streamlining of an enormous amount of evaluation materials and tasks are desired</u> to make evaluation viable in bounded time. These are necessary for the agency to firmly secure the time to spare for R&D activities which are its primary objective, and manage business operations in an efficient manner to maximize R&D achievements.</p>

1. Overall rating	
Rating * (S, A, B, C, D)	A
Reasons for rating	As shown in the overall evaluation of the agency as a whole, the creation of considerable achievements and anticipated creation of achievements in the future and so on were recognized as a result of comprehensive consideration based on circumstances surrounding the agency's business achievements, efforts and so on through its activities and with the national research and development agency's mid to long-term objectives taken into account.

2. Evaluation of the whole agency	
<p>○ In the 3rd mid-term objective period, JAMSTEC carried out R&D on the basis of national and social needs as a core research institution in Japan as an Oceanic State, and <u>produced excellent achievements gathering worldwide attention in various R&D fields including marine and global environmental changes and sea area seismogenic zones. It also disclosed its data and insights obtained not only to the state and municipalities but also domestic and overseas policy decision processes concerning global issues to contribute to disaster management and mitigation measures, as well as promoting technological transfer to the industrial arena.</u> The achievements can, therefore, be evaluated as more extensive than the targets and originally planned. Specifically:</p> <p>(1) JAMSTEC has successively published internationally appreciated achievements about various research themes in a wide range of R&D fields on marine and global environmental changes. <u>In particular, considerable achievements affecting international environmental policies and measures were produced one after another in the latter half of the mid-term objective period, including the clarification of overestimate in the amount of coal-derived methane emissions in East Asia, and effects of deforestation and plantation on CO2 balance in Southeast Asia.</u> With the importance of scientific insights based on these achievements being recognized, executive directors and researchers of the agency were selected as expert members, chairs and other key posts in international organizations and frameworks, as well as the lead author and review editor for the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), which contributed to improving the international presence of JAMSTEC and Japan.</p> <p>(2) In R&D on sea area seismogenic zones, JAMSTEC <u>completed the construction of the world largest, densest and most accurate Dense Oceanfloor Network System for Earthquakes and Tsunamis (DONET) in FY2015, and produced considerable achievements in understanding the mechanism of ocean-trench earthquakes, including the clarification of repeated occurrence of “slow slip” in the shallow part of seismogenic zones by analyzing real-time observation data with a borehole observing system connected to DONET. Part of data and scientific insights obtained was distributed to the Headquarters for Earthquake Research Promotion and the Japan Meteorological Agency. The Tsunami Inundation Prediction System, developed based on the data from DONET, was offered to Wakayama, Mie and Kagawa prefectures and other local governments to support their disaster management and mitigation measures.</u></p> <p>(3) JAMSTEC <u>constructed a cobalt-rich crust genetic model, which also has an academic significance, in R&D on seabed resources, and based on this model, discovered a large mineral deposit. It also proposed a technique to largely accelerate the analysis of effects on deep-sea ecological system and promoted technological transfer to private research laboratories.</u></p> <p>○ JAMSTEC also <u>organized Team KUROSHIO to challenge Shell Ocean Discovery XPRIZE in this mid-term objective period based on the development and operation technologies such as deep-sea probes owned by JAMSTEC, and collective potentials of related organizations throughout the nation. The activities were extended to efforts for implementing new public relations by effectively using SNS and cloud funding, and establishing new partnerships and collaborations with companies of various nontraditional businesses and scales.</u> These can be evaluated as significant achievements, not simply being joint research or technical development.</p> <p>○ In this mid-term objective period, <u>serious incidents jeopardizing the credibility of organization were revealed, including false tabulation of outcome indexes such as the number of papers and patents, omission of procedures for data disclosure and utilization, and wrong transmission of private information. JAMSTEC set up a working group for improving problems common to the organization (“WG”) in the Internal Control Committee not only for searching the direct causes of individual incidents but also commencing efforts to investigate problems and risks common to the organization. In addition to the response to the causes of individual incidents (e.g. human errors, flawed or mere formal system), it is strongly recommended to find root causes of these incidents and thoroughly take measures to prevent recurrence in the future.</u></p> <p>Taking all of these into account, the whole agency is rated A for reasons that JAMSTEC started efforts to find causes and take measures against the administrative (organizational management) problems by voluntarily setting up a working group and obtained a number of considerable achievements worth of A rating in R&D, which is the main duty of a national research and development agency.</p>	

3. Issues to be solved and /or improved for each subject

- As the importance of research activities for observing, collecting and analyzing ever-growing, large amounts of information and data increases in the future, adequate management of these information and data is required as a prerequisite for conducting research. JAMSTEC is recommended to establish a substantial management system for this purpose.
- In the 3rd mid-term objective period, serious problems took place in organizational management such as false tabulation of outcome indexes for the number of papers and patents, etc., omission of procedures for data disclosure and utilization, and wrong transmission of private information. No doubt, human errors and a flawed or mere formal system are major causes of these problems. Taking measures for improving individual cases is essential, but also strongly recommended are the clarification of the root causes of these problems and implementation of viable measures for preventing recurrence.

4. Other items

Main opinion of the National Research and Development Agency Council

- [Evaluation of the whole agency in terms of maximization of R&D achievements]
- Efforts for collecting opinions and advices adequately in and out of JAMSTEC including self-evaluation conferences, JAMSTEC Advisory Board (JAB) and management advisory committee and maximizing R&D achievements of the whole agency were recognized.
 - Enhancement of international presence of the organization and its researchers is essential for JAMSTEC to contribute to resolving global environmental problems, maintaining marine biodiversity and promoting continued utilization. For example, a number of executives and researchers participated in international activities such as the international expert panel as a committee member or IPCC reports, etc. as an editor in this mid-term objective period. This proves that they are not only well-known researchers through academic journals, but key persons who take a lead in international programs and initiatives from scientific and political standpoints. It could also be an evidence of increased international presence of JAMSTEC.
JAMSTEC is a unique entity domestically and internationally in that it is capable of accessing deep oceans and deep subterranean environments under the seabed where no one has ever been to, and conducting onsite analysis about unusual phenomena in those places or carrying samples back for analysis, or acquiring large amounts of data. It maximized these potentials and made a number of world's first discoveries, but formulation of strategies and schemes to make use of these scientific insights in society, or "the creation of outcomes," is not satisfactory, which was also subject to criticism in the past. In an attempt to respond to the criticism, JAMSTEC has made proactive efforts, particularly in the latter half of the mid-term objective period, including the establishment of social infrastructure for disaster management and mitigation, participation in the international framework for adaptation to global environmental changes, transfer of technologies regarding the development of seabed materials to the private sector, formulation of an open innovation system in the field of marine life science and engineering research, and delivery of deep-sea bio-resources to the outside organizations. The scheme to make use of the results of research in society can be evaluated as being functioning.
 - JAMSTEC made considerable achievements in various fields of R&D, which is the major operation of the agency, and promoted R&D for producing outcomes. For example, it supported local governments to utilize the Tsunami Inundation Prediction System in R&D on sea area seismogenic zones, and in R&D on seabed resources, constructed an ore genetic model, and based on the prediction with this model, discovered a cobalt-rich crust. These can be evaluated as considerable achievements. Not only routine operations, JAMSTEC also well responded to emergency operations due to earthquakes and volcanic eruption, etc. and related follow-up operations.
 - JAMSTEC accelerated internal and external collaboration with contributions to society in mind. Collaboration will be further promoted in the future.
 - With regard to rankings such as the number of papers with a high impact, JAMSTEC is judged to be the center of earth science taking a lead in the relating fields in Japan, but in international perspective, its positions seem to lower bit by bit in all categories, including the recent downward trend in the percentage of Japanese papers in top 10% of highly cited papers. It is feared that this tendency may be difficult to be overturned when the agency keeps conventional operations.
- [Management as a research institute such as the President's leadership management]
- Commencement of efforts for improving awareness of staff in performing tasks to cope with false tabulation of the number of papers, wrong transmission of private information and other incidents can be evaluated at the least as the start of necessary countermeasures. On this occasion, besides false number of papers and wrong transmission, continuous awareness and operational improvements may be required to eliminate negative factors to prevent adequate operation due to insufficient awareness or defects in the check system.
 - A number of managerial problems have occurred. JAMSTEC must identify the root causes of these problems and take, not superficial solutions, but drastic measures for preventing recurrence (e.g., possibilities of improving the motivation of field staff or workplace culture). Progress of efforts to publish or deliver outstanding research in an easy-to-understand way can be evaluated, but low-profile, consistent efforts and tasks to consolidate the foundation must also be tackled in addition to spectacular efforts.
 - Serious incidents such as false tabulation of the number of papers and patents, etc., omission of procedures for data disclosure, wrong transmission of private information, and so on, occurred frequently. In particular, the inadequate state of the former two incidents, which has been overlooked for a prolonged period of time, shows the seriousness of the situation. There is no doubt that

	<p>human errors and a flawed or mere formal system are direct causes of these problems, but the more substantive question is that the recognition and a sense of crisis that these problems would jeopardize the credibility of the organization and a sense of responsibility for risk management appear to be weak both in management and field staff. Immediate review of rules and structures is required, but considering the deep-rooted problems, more substantive improvement of organizational constitution must be discussed in mid to long-term periods with efforts to raise awareness in light of both management and field staff.</p> <ul style="list-style-type: none"> ○ The number of researchers moving out exceeds the number of researchers moving in probably because of the pressure to reduce labor cost. However, the proper level of staff and selection of research fields must be discussed with the motivation of staff sustained. ○ Ensuring more diversified human resources and internationalization of JAMSTEC are imperative for the future growth of the agency, but feasible tactics are limited. When the domestic population of men and women in the 18-year-old bracket is continuously declining, and revenues for research are increasingly difficult to secure, a fundamental review of the modality of research may be required. Practical discussions including the assumption of how to accomplish considerable achievements (output) with fewer resources (input) and suitable application of new technologies such as submerged drones must be made to clarify the future vision.
Auditor's special comments	No special matters to note.

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- S: Based on the National Research and Development Agency's aims, businesses, mid to long-term objectives and so on, as a result of comprehensive consideration based on some circumstances regarding the agency's business achievements, efforts and so on through its activities, especially the creation of considerable achievements, anticipated creation of special achievements in the future and so on toward "maximization of R&D achievements" under the conditions of appropriate, effective and efficient operations are recognized.
- A: Based on the National Research and Development Agency's aims, businesses, mid to long-term objectives and so on, as a result of comprehensive consideration based on some circumstances regarding the agency's business achievements, efforts and so on through its activities, the creation of considerable achievements, anticipated creation of achievements in the future and so on toward "maximization of R&D achievements" under the conditions of appropriate, effective and efficient operations are recognized.
- B: Based on the National Research and Development Agency's aims, business, mid to long-term objectives and so on, as a result of comprehensive consideration based on some circumstances regarding the agency's business achievement, efforts and so on through its activities, a certain degree of expectation for the creation of achievement and creation of achievement in the future toward "maximization of R&D achievements" were recognized, and steady business operations have been also recognized.
- C: Based on the National Research and Development Agency's aims, businesses, mid to long-term objectives and so on, as a result of comprehensive consideration based on some circumstances regarding the agency's business achievements, efforts and so on through its activities, the creation of achievements, further drastic efforts and improvements toward "maximization of R&D achievements" or "the appropriate, effective and efficient operations" are anticipated.
- D: Based on the National Research and Development Agency's aims, businesses, mid to long-term objectives and so on, as a result of comprehensive consideration based on some circumstances regarding the agency's business achievements, efforts and so on through its activities, special efforts and improvements including a fundamental drastic review, toward "maximization of R&D achievements" or "the appropriate, effective and efficient operations" are required.

Mid to long-term objectives (Mid to long-term plan)	FY evaluation					Mid to long-term objective period evaluation	Itemized evaluation document No	Remarks
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018			
I. Maximization of R&D achievements and quality improvement of the other operations								
1.Promoting strategic/focused research development on a basis of national/social needs	-	-	-	-	-	-		
(1) Seabed resources R&D	B	B	A	A		A	I-1-(1)	
(2) Marine and global environmental change R&D	B	A	A	A		A	I-1-(2)	
(3) Sea area seismogenic zone R&D	B	A	A	S		A	I-1-(3)	
(4) Marine life science and engineering R&D	B	B	B	A		A	I-1-(4)	
(5)①Promotion of comprehensive offshore drilling science utilizing advanced drilling technology	B	A	A	A		A	I-1-(5) -①	
(5)②Development for R&D of leading-edge fusion information science	B	A	B	A		A	I-1-(5) -②	
(5)③Construction of R&D infrastructure to open up the ocean frontier	B	B	B	B		B	I-1-(5) -③	
2. Building the basis of R&D	-	-	-	-	-	-		
(1) Ships and deep-sea research systems etc.	B	B	A	B		B	I-2-(1)	
(2) “Earth simulator”	A	B	A	A		A	I-2-(2)	
(3) Operation of other facilities and equipment	B	B	B	B		B	I-2-(3)	

Mid to long-term objectives (Mid to long-term plan)	FY evaluation					Mid to long-term objective period evaluation	Itemized evaluation document No	Remarks
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018			
II. Items concerning the efficiency of the administration of the operations								
1. Flexible and efficient system operations	-	-	-					
(1) Enhancement of internal controls and governance	B	B	B					
(2) Rational and efficient allocation of resources	B	B	B					
(3) Implementation of evaluation	B	B	B					
(4) Promotion of information security measures	B	B	B					
(5) Information disclosure and personal information protection	B	B	B					
(6) Ensuring business safety	B	B	B					
2.Streamlining and efficiency of operations	-	-	-	-	-	-		
(1) Streamlining and efficiency of operations	B	B	B					
(2) Appropriateness of salary levels	B	B	B					
(3) Review of office work business	B	B	B	B				
(4) Appropriateness of contract	B	B	B	B				

3. Provision and promotion of usage of the information related to the marine-earth science	-	-	-	-	-	-		
(1) Providing and promoting the use of data and samples	B	B	A	A		A	I-3-(1)	
(2) PR activities	B	A	A	A		A	I-3-(2)	
(3) Dissemination of achievements	B	B	C	B		B	I-3-(3)	
4. Promotion of the international cooperation and human resources development as a base of brain circulation progresses on a global scale	-	-	-	-	-	-		
(1) International cooperation and the project promotion	B	A	A	A		A	I-4-(1)	
(2) Improvement of human resource development and qualities	B	B	B	B		B	I-4-(2)	
5. Innovation creation and promotion of the return of results to the society through the industry-academia cooperation	-	-	-	-	-	-		
(1) Research cooperation through joint research and institutional cooperation	B	B	A	A		A	I-5-(1)	
(2) Right size and appropriate management of R&D achievements	B	B	B	C		B	I-5-(2)	
(3) Practical application and commercialization of R&D achievements	B	B	B	B		B	I-5-(3)	
(4) Promotion of research by external funds	B	B	B	B		B	I-5-(4)	

III. Items regarding improvements in financial related matters									
Budget (Including personnel expenses)/ income and expenditure plan, and funding plan	B	B	B			B	B	III - VI	III. Evaluated with the items regarding improvements in financial related matters
Limit amount of short-term borrowing	-	-	-						
If the agency intends to transfer or provide as collateral any important property, a plan therefor;	-	B	-						
Purpose of using accumulated profit	-	-	-						
IV. Other items									
Plans for equipment and facilities	B	B	B	B			B	VII-1	
Plans for personnel	B	B	B	B			B	VII-2	
Debt burden over the mid-term objective period	-	-	-	-			-	VII-3	
Use of a reserve fund	-	-	-	-			-	VII-4	

* For items that are set to “high” level of importance, a “circle” shall be marked next to each comment.
For items that are set to “high” level of difficulty, each comment shall be underlined.

* The evaluation is based on the “Standards for Evaluation of Incorporated Administrative Agencies under the Jurisdiction of the Ministry of Education, Culture, Sports, Science and Technology” (decided by the Minister of Education, Culture, Sports, Science and Technology on June 30, 2015. The details are as follows:

[R&D related administrative and business operations (I)]

S: Based on the National Research and Development Agency’s aims, businesses, mid to long-term objectives and so on, and as a result of comprehensive consideration based on some circumstances regarding the agency’s business achievements, efforts and so on through its activities, especially the creation of considerable achievements, anticipated creation of special achievements in the future and so on toward “maximization of R&D achievements” under the conditions of appropriate, effective, and efficient operations are recognized.

A: Based on the National Research and Development Agency’s aims, businesses, mid to long-term objectives and so on, and as a result of comprehensive consideration based on some circumstances regarding the agency’s business achievements, efforts and so on through its activities, the creation of considerable achievements, anticipated creation of achievements in the future and so on toward “maximization of R&D achievements” under the conditions of appropriate, effective, and efficient operations are recognized.

B: Based on the National Research and Development Agency’s aims, businesses, mid to long-term objectives and so on, and as a result of comprehensive consideration based on some circumstances regarding the agency’s business achievement, efforts and so on through its activities, a certain degree of expectation for the creation of achievement and creation of achievement in the future toward “maximization of R&D achievements” were recognized, and steady business operations have been also recognized.

C: Based on the National Research and Development Agency’s aims, businesses, mid to long-term objectives and so on, and as a result of comprehensive consideration based on some circumstances regarding the agency’s business achievements, efforts and so on through its activities, the creation of achievements, further drastic efforts and improvements toward “maximization of R&D achievements” or the “appropriate, effective, and efficient operations” are anticipated.

D: Based on the National Research and Development Agency's aims, businesses, mid to long-term objectives and so on, and as a result of comprehensive consideration based on some circumstances regarding the agency's business achievements, efforts through its activities, special efforts and improvements including a fundamental drastic review, toward “maximization of R&D achievements” or the “appropriate, effective, and efficient operations” are required.

[Operations other than R&D related administrative and business operations (after II)]

S: Through the activities of a corporation, remarkable performance exceeding the intended objectives is recognized quantitatively and qualitatively in the medium-term plan (in terms of quantitative indicators, 120% or more vis-à-vis planned medium-term value (or planned FY value), and remarkable performance is also recognized qualitatively)

A: Through the activities of a corporation, remarkable performance exceeding the intended objectives is recognized in the medium-term plan (in terms of quantitative indicators, 120% or more vis-à-vis planned medium-term value (or planned FY value).

B: Performance exceeding the intended objectives is recognized in the medium-term plan (in terms of quantitative indicators, 100% or more but less than 120% vis-à-vis planned medium-term value (or planned FY value).

C: Performance falls below the intended objectives in the medium-term plan, requiring improved performance (in terms of quantitative indicators, 80% or more but less than 100% vis-à-vis planned medium-term value (or planned FY value).

D: Performance falls below the intended objectives in the medium-term plan, requiring drastic improvement of business including its abolition (in terms of quantitative indicators, less than 80% vis-à-vis planned medium-term values (or planned FY value), or it is recognized that the competent Minister is required to ask for improving business operations or taking other necessary measures).