

Evaluation of FY2017 Operating Results for Japan Agency for  
Marine-Earth Science and Technology

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	FY2017 (3rd term)	
	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 FY2017 evaluation of business performance, etc., 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<sup>(*)</sup>.</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&amp;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&amp;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&amp;D activities which are its primary objective, and manage business operations in an efficient manner to maximize R&amp;D achievements.</p>	

1. Overall rating						
Rating * (S, A, B, C, D)	A	(Reference) Overall rating in the past fiscal years in this mid to long-term objective period				
		FY2014	FY2015	FY2016	FY2017	FY2018
		B	B	A	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>○ JAMSTEC carries out strategic and focused research and development (“R&amp;D focusing on the solution of issues”) on the basis of national and social needs as a core research institution in Japan as an Oceanic State. <u>In FY2017, achievements, highly acclaimed domestically and internationally, were obtained in various R&amp;D areas. Of these, some data and scientific insight have been used as evidence of the process of determining policies and measures in Japan and abroad, contributed to disaster management and mitigation by the state and municipalities, and started to be used in actual marine zone surveys and sample analysis by private companies.</u> The progress can, therefore, be evaluated as more extensive than the targets and originally planned. Some examples of considerable achievements are shown below.</p> <p>(1) Scientific importance of R&amp;D on marine and global environmental changes has been internationally recognized, and a large number of research achievements which might lead discussions on environmental policies in Japan and abroad have been disclosed.</p> <p>For example, <u>presentation of the importance of rainfall in tropical coastal areas in the global water balance is a breakthrough pressing for changes in the conventional knowledge that global water circulates between two zones, the sea and land.</u></p> <p>In addition, <u>clarification of effects of deforestation, etc. on CO<sub>2</sub> balance in Southeast Asia is a considerable achievement useful for solving unsolved problems since the Fifth Assessment Report (AR5) phase of the Intergovernmental Panel on Climate Change (IPCC), and may be used as a reference in the strategic promotion of human-caused CO<sub>2</sub> emissions management in the international community.</u></p> <p>(2) Academic significance of R&amp;D on sea area seismogenic zones is marked, and R&amp;D achievements contributing to state and municipal disaster management and mitigation have been obtained.</p> <p>For example, <u>repeated occurrence of “slow slip” in the shallow part of seismogenic zones was unraveled</u> by analyzing real-time observation data with a borehole observing system connected to the Dense Oceanfloor Network System for Earthquakes and Tsunamis (DONET). This is one of especially considerable achievements for understanding the mechanism of ocean-trench earthquakes. <u>Part of data and scientific insights obtained was distributed to the Earthquake Research Committee, Headquarters for Earthquake Research Promotion and JMA Nankai Trough Earthquake Assessment Committee, etc.</u></p> <p><u>Data from the Tsunami Inundation Prediction System has also been increasingly distributed to municipalities as further contribution to disaster management and mitigation.</u></p> <p>(3) R&amp;D on marine life science and engineering has produced many achievements highly acclaimed domestically and internationally, including <u>the discovery of deep-sea microbes having unknown metabolic pathways.</u></p> <p>(4) R&amp;D on advanced integrative information science includes research projects leading to social implementation such as <u>the construction of a malaria incidence prediction model</u> with a focus on the correlation between climate change in South Africa and changes in the incidence of malaria and distribution of the model to <u>the national epidemic infection laboratories and health relating personnel.</u></p> <p>(5) Besides, <u>various requests of analysis and technical consultations have been made for high-precision, high-resolution analyzing technologies (ultrahigh-resolution TEM analyzing technologies and TE-TIMS method for an infinitesimal quantity of samples)</u> developed for sample analysis. A variety of applications are expected for <u>underwater optical wireless communications with transmission speed equivalent to about 1,000 times the speed of acoustic wireless communications.</u></p> <p>○ Outstanding consequences have also been achieved by the Development and Operation Section and Administration Section, including the creation of opportunities for matching between research seeds and industrial needs through <u>the release of the “Deep-sea Debris Database”</u> which has an international impact, <u>“Team KUROSHIO” activities</u> using SNS and cloud funding effectively, and <u>“Ocean &amp; Business Innovation Convention (Umicon 2018) cosponsored with Yokohama City, etc.</u></p> <p>○ FY2017 is also the year in which <u>serious incidents jeopardizing the credibility of organization were revealed</u>, including false tabulation of outcome indexes such as the number of 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 <u>the response to the causes of individual incidents (e.g. human errors, flawed or mere formal system), implementation of measures is required to find root causes of these incidents and make a systematic and take viable recurrence prevention measures in the future.</u></p> <p>Taking all of these into account, the whole agency was rated A for reasons that JAMSTEC started efforts to find causes and prevent recurrence of organizational operation and management problems discovered recently while having obtained a number of considerable achievements worth of A rating in R&amp;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

- [I-1. Promoting R&D focusing on the solution of issues]
- With regard to this item which defines the promotion of R&D focusing on the solution of issues, as the next year is the last year of this mid-term objective period, it is required not only to produce a list of operations implemented and resulting achievements and outputs by individual research themes, but also to clarify the state of achievement of mid-term objectives in the whole R&D areas (the entire picture), such as ways of obtaining particular outputs (research achievements) in the whole areas, meaning and positioning of the creation of these outcomes, and future issues.
  - In promoting R&D focusing on the solution of issues, efforts are now made for the acquisition of highly significant scientific and academic research achievements as well as creation of outcomes indicated in mid-term objectives and flowcharts, and execution of a large volume of output-oriented R&D with administrative contribution and social implementation in mind. There are some cases of full-fledged deployment of deep-sea bio-resource distribution projects and technological transfer of achievements to private companies in efforts for industrial development of R&D achievements and creation of innovation, but standard practical application or commercialization has not yet to be started. Steady accumulation of specific success cases and timely review of projects, systems and structures are required in the future with a clearer and specific scenario to create groundbreaking innovation.
- [I-2 to I-5 and after II]
- With regard to items concerning activities of the Development and Operation Section and Administration Section, objective self-evaluation is required with as many indexes as possible about effects of efforts implemented on the sought-after outcomes in the next fiscal year which is the last year of the mid-term objective period.
  - With regard to the acquired rights for and adequate management of R&D achievements, JAMSTEC is strongly recommended to take viable recurrence prevention measures and firmly disseminate them in the organization for producing and publishing accurate tabulation results based thoroughly on the recognition that intellectual property related data such as patents is an important index to estimate achievements of a research institute as well as papers.
  - In addition to false tabulation of patents, etc., a number of managerial problems, jeopardizing the credibility of organization, also surfaced in FY2017. It is strongly recommended to clarify root causes of these problems and take thorough recurrence prevention measures.

4. Other items

Main opinion of the National Research and Development Agency Council	<p>[Evaluation of the whole agency in terms of maximization of R&amp;D achievements]</p> <ul style="list-style-type: none"> <li>○ 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&amp;D achievements of the whole agency were recognized.</li> <li>○ All of R&amp;D subjects produced achievements exceeding the original plan. Transmission of these achievements (public relations, outreach efforts) to society, and transfer of developed technologies to the private sector are also in progress.</li> <li>○ Steady results have been obtained using proprietary observation equipment.</li> <li>○ JAMSTEC has been internationally recognized as a research institute with notable achievements. It is invaluable in the field of marine-earth science, in particular, in the research of marine organisms in marine earthquakes and ultimate environments, which is far ahead of others. DONET is an observation network that also receives world’s attention, and expected to contribute not only to research achievements but to disaster management and mitigation.</li> </ul> <p>[Management as a research institute such as the President’s leadership management]</p> <ul style="list-style-type: none"> <li>○ A wide range of research activities are maintained while efforts in consideration of collaboration with companies are in progress. Management to guide a complicated organization is proper. Efficient operational results could be evaluated considering a difficult situation in which operational costs are difficult to be ensured.</li> <li>○ JAMSTEC seems to recognize that more diversified human resources are required to develop the organization, and have taken relevant measures, but results are not so substantial. Considering that efforts for securing outstanding foreign researchers (post-doctoral and over the middle ranking researchers) are not easy for other research institutes and universities in Japan, efforts by JAMSTEC, a world’s preeminent marine research center, and consequences seem to be noteworthy. Active efforts must be continued while ways to prevent excessive burdens imposed on existing staff are devised.</li> <li>○ 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 could be evaluated at the least. On this occasion, besides false number of papers and wrong transmission, continuous awareness and operational improvements may be required to eliminate the factors disturbing operational adequacy due to insufficient awareness or defects in the check system.</li> <li>○ Problems caused by mistakes relating to core elements of a research and development agency, such as false tabulation of the number of patents and omission of procedures for data disclosure, jeopardize the credibility of organization, and should be strictly handled with thorough countermeasures and preventive measures in the future.</li> <li>○ Management is insufficient. Discussions of issues on papers, patents and wrong transmission of e-mail are not thorough and complete. Investigation into true causes for correcting an important incident of private information leak, or “5 whys analysis” is insufficient. It should be addressed as the classification of importance of data and handling of management level issues, not resolved as human errors.</li> </ul> <p>[Response to matters pointed out at the sub-committee in FY2016 for promoting R&amp;D focusing on the solution of issues]</p>
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	<ul style="list-style-type: none"> <li>○ With regard to self-evaluation using mid-term objectives flow chart (“flowchart”) and roadmap, understanding of both JAMSTEC and sub-committee has progressed to a certain level, and this may act favorably in communications between both parties.</li> <li>○ Modifications on the roadmap were indicated more understandably. This should be taken in a proactive manner, not in a restricted manner, and it is expected to be continued to make clear the background of modifications and need for modifications.</li> <li>○ The current flowchart and roadmap system is considered to be used to a maximum extent. However, the degree of difficulty and setting concept of outcomes on the flowchart are not uniform depending on R&amp;D fields and subjects, and it cannot be denied that these cause imbalance when edited into the same roadmap. Further discussions are necessary in setting the next mid-term objectives.</li> <li>○ It is felt that, in addition to listing of individual research achievements, efforts in perspective of suggesting, for example, every finding and its degree in the entire picture of marine research for the whole agency are also necessary. The significance of existence of the organization could also be indicated by doing so.</li> <li>○ It is impossible to know whether the morale for basic research is maintained or improved for a short period of time, and difficult to make judgment at this moment, but continuous efforts are expected to promote cross-sectoral, mutual understanding.</li> </ul>
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*					Itemized evaluation document No	Remarks
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018		
<b>I. Maximization of R&amp;D achievements and quality improvement of the other operations</b>							
1.Promoting strategic/focused research development on a basis of national/social needs	-	-	-	-			
(1) Seabed resources R&D	B	B	A	A		I-1-(1)	
(2) Marine and global environmental change R&D	B	A	A	A		I-1-(2)	
(3) Sea area seismogenic zone R&D	B	A	A	S		I-1-(3)	
(4) Marine life science and engineering R&D	B	B	B	A		I-1-(4)	
(5)①Promotion of comprehensive offshore drilling science utilizing advanced drilling technology	B	A	A	A		I-1-(5) - ①	
(5)②Development for R&D of leading-edge fusion information science	B	A	B	A		I-1-(5) - ②	
(5)③Construction of R&D infrastructure to open up the ocean frontier	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		I-2-(1)	
(2) “Earth simulator”	A	B	A	A		I-2-(2)	
(3) Operation of other facilities and equipment	B	B	B	B		I-2-(3)	
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		I-3-(1)	

Mid to long-term objectives (Mid to long-term plan)	FY evaluation*					Itemized evaluation document No	Remarks
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018		
<b>II. Items concerning the efficiency of the administration of the operations</b>							
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			
<b>III. Items regarding improvements in financial related matters</b>							
Budget (Including personnel expenses)/ income and expenditure plan, and funding	B	B	B	B			



- 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).