

## Estimating the Annual Number of Tourists and Tourism Demand Characteristics on Yakushima Island

—A highly Accurate Estimation Method on Remote Islands—

屋久島における年間観光客数と観光需要特性の推計  
～離島におけるより精度の高い推計法～

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### Abstract

This research is to analyze economics impact of the ecotourism industries in Yakushima Island. Focusing on around year 2000. It was found that there were 200 thousand visitors to Yakushima in a year approximately, 19-21% of which (34000-38000 people) took part in ecotourism activities. The percentage of visitors who were ecotourists almost increased threefold from 12% in the summer of 1997 to 30% in that of 2002. 57-60% of ecotourists used package tours, and this result implied the ecotourism industries had tight relationship with the travel agencies, that that is, the ecotourism industries in Yakushima Island has developed based not on alternative tourism but on an optical tourism but on an optical tourism in mass-tourism industries. The business analysis made it clear that the ecotourism industries were considerably in good business environment; consequently, the total amount of sales in the Yakushima ecotourism industries uses were estimate to be 510-570 million yen in a year. The dramatic rise in the number of ecotourists may result in excessively intensive uses mountain regions. Though the public authorities have conducted a variety of projects such as regulations of ordinary-car entries, fundamental issues concerning overuse issues still remain.

**Keywords:** ecotourism, world natural Heritage, Estimation method, tourism resources

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屋久島毎年在游客数和观光需要特殊性的推算，用精确度高的方法推测。

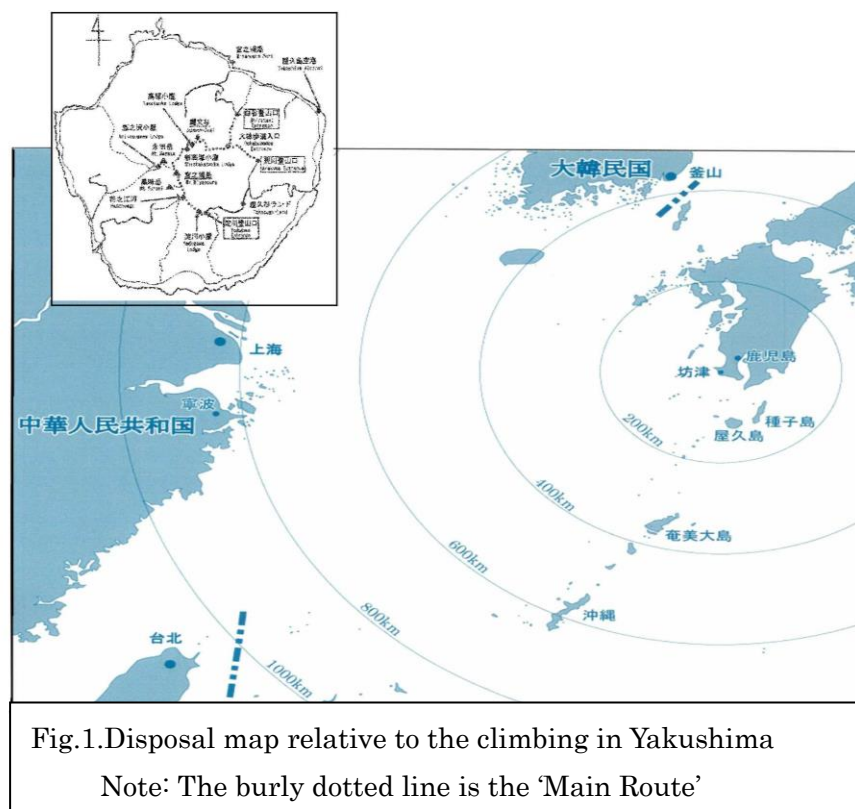
竹下俊一<sup>1)</sup>、李礼<sup>2)</sup>、石田尾博夫<sup>3)</sup>

本调查研究知道什么是生态旅游和组件关系。理论上受到轮流二韵律的潮流，发展的东西被当作生态旅游。但是，与鱒鱼二韵律的关系在屋久島进行的生态旅游更紧密被了解清楚

了。能理解为包价旅游的自选旅游，而不是被提倡的轮流二韵律的潮流从以上的结果理论上存在着屋久岛的生态旅游。

用竹下俊一的报告，利用关于时间顺序性的分析 X<sup>2</sup> 审定以及剩余误差分析，在 1997 年和 2002 年是，并且统计学上在观光需要可以看到差别，或者验证了。以及，关于零假设被显著水平 5%拒绝的东西，正用正文提到。

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### 1. Thesis summary

In recent years, it has become clear that World Heritage sites, which are supposed to preserve and share the value of precious cultural properties and nature, are facing various problems, such as a rapid increase in the number of tourist and environmental destruction, as they become more and more of a tourist destination being registered. World Heritage sites in various parts of the world are now suffering from a balance

between the protection of Heritage and the use of tourism. This paper examines the function and role of the World Heritage registration in the system of tourism, based on the awareness that “Why does this dilemma arise at World Heritage sites?” 1)

This report is a modified version of the Shunichi TAKESITA paper (Summary) “Characteristics of ecotourists users in Yakushima, a World Heritage Site “ presented at the 55 “ Social an industrial

enterprise development policy in East Asia” International Conference (2019.7.20 Tongji University, Shanghai, China ). The economic impact of the ecotourism business conducted in the research object place, Yakushima Island, Kagoshima prefecture, on the local community was analyzed from the viewpoint of the demand side (tourist side), focusing around A.D.2000, which was held at (14 municipalities in Asia 20 and the Pacific : 5 governmental organizations, UNESCO World Heritage Center) “*The 1st World Natural Heritage Meeting* (Yakushima Island)” 1) sponsored by the Executive Committee of World Natural Heritage Conference. “Economic Analysis of Ecotourism Industry in Yakushima Island 2) by Shigemitsu SHIBASAKI and others is cited as a prior research.”<sup>2)</sup>

The following are the main points.

(1) Of the 200,000 or so tourists who visit Yakushima annually, about 34,000-38,000 people, or 19~21% of the total, used ecotours during their stay in Yakushima (2001 – 2002). Seasonally, 19% of tourists used ecotourism in the fall, 7% in winter, 21% in spring, and 30% in summer. (2) The majority of tourists using ecotourism (57~60%) use package tours (Below is a package tour.) indicating the close relationship between ecotourism and package tours. Furthermore, (3) Analysis of the management structure of the ecotourism industry revealed that labor costs accounted for 50% of the costs.

On the other hand, the depreciation cost was smaller than that of the hotel business and hotel management., suggesting that the amount of investment required for opening a business was not huge. As a result of the break-even point analysis, sales exceeded the break-even point sales, and the break-even point ratio was smaller than that of the hotel industry, it was assumed that the business environment was favorable. Annual ecotourism sales in Yakushima were estimated at 510 million – 500,000,007 yen. While the business environment of the ecotourism business is good, the environmental load to the mountainous area has also increased. In response to the situation, public organizations have introduced various measures such as Arakawa Tozan Bus (shuttle bus system). but no drastic measures have been taken.

Theoretically, ecotourism developed in response to the trend of alternative tourism is considered to be ecotourism. (4) The authors conclude that ecotourism in Yakushima can be interpreted not as a trend of alternative tourism but as an optical tour of package tours.

## 2. Outline of the survey area

Yakushima Island in Kagoshima prefecture, located about 135km south of Kagoshima City in a straight line, is an almost circular island that stretches 28 km from east to west and 24 km from

north to south. Today's administrative area is Yakushima-town (But *Kuchino-erabu-Island* is also included.). Yakushima Island, with an area of 50,486 ha, is about 60% of *Sado Island* (85,452 ha) and about 2.7 times of *Rishiri Island* (18,215 ha). In December 1993, 10,747 hectares of Island, mainly mountainous areas, which account for about 21% of the island, was registered as a World Natural Heritage site. The reason for the registration was that it was evaluated for its unique landscape represented by yak cedar (Criterion 7: Landscape Standards) and for its diverse vegetation ranging from warm temperature to cold temperate (Criterion 9 Ecosystem criteria).

The greatest mountain Kyushu, *Mt. Miyanoura-dake* (1936 m), is located in the mountainous region, and the giant “*Yakusugi-cedar*” growing in the mountains is an important resource, but the “*Jomon-cedar*” with a chest-height of 5 and 22 meters is a particularly popular destination for eco-tourism in this report. In the mountain area, there is a natural recreation forest called *Yakusugi Land* and *Shiratani-Unsuikyo*, and there is also a place where ordinary tourists can easily enjoy the nature of Yakushima. The population of Yakushima-town reached 23,010 in 1960 and continued to decrease until the end of the 1980s, but has remained stable at 13,000-14,000 since the 1990s. According to the 2010 census, the population was 13,592

(Including *Kuchino-erabu* Island).

Next point shows the rise fall of the construction industry using statistical data. In the *Kumage* area as whole (Part of *Tanegashima Island* and Yakushima Island), public works spending continued to increase even in the 1990's. This suggests that before and after the World Heritage registration, the Yakushima Cultural Center and Center for environmental and Cultural Studies in Kagoshima Prefecture, the Yakushima Heritage Center in the Ministry of the Environment, roads to access mountainous areas, and so on were improved. However, since 1999, the amount of public works projects has been on the decline due to the bitter smile of public works projects after the bursting of the bubble economy. In response to the decrease in the volume of projects, construction companies are also suffering.

As mentioned above, the tourism industry is growing amid severe conditions in the agriculture, fishery, and construction industries. The symbolic data of this change is the number of visitors in Yakushima (**fig.2**). The launch of the high-speed vessel in 1983 increased the carrying capacity in terms of transportation. The registration of (1993) as a World Natural Heritage Site also served as a stimulus, and the number of visitors has been increasing since the 1990s. Furthermore, due to the fact that the total eclipse of the moon can be seen

in Yakushima Island, the annual number of visitors reached about 400,000 in 2009, but has since decreased to about 350,000 around 2010. It should be noted that the number of visitors includes not only tourists but also local visitors.

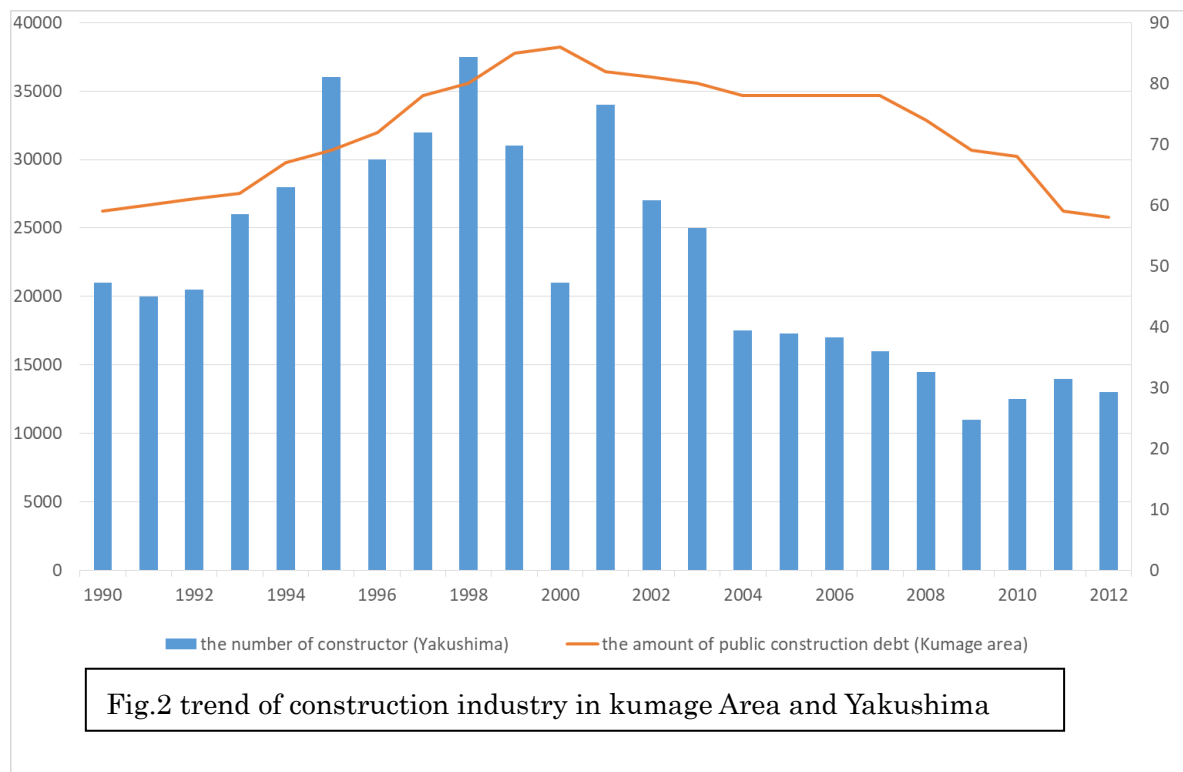
The total of the tourist rate original apart from a seed Yakushima office of tourism according to SHIBAZAKI's report and others questionnaire survey of showing, twice, 1997 and 2001-2002, when the tourist who does and uses a large ship of irregular service was included, I made it clear that a tourist of about 200,000 people a year is visiting Yakushima.<sup>2)</sup>

Twenty years later, it is certain that the tourism industry in Yakushima has grown, and has grown into a key industry on the

island after being registered as a World Natural Heritage Site.

### 3. Characteristic of ecotourism Customers who came out from the questionnaire survey <sup>7)</sup>.

As for the attributes of eco-tourism users are males, while eco-tourism users have more than half of females at all times. (*Table 1*). In the summer of 1997, women accounted for 34% of ecotourism users, but in the summer of 2002 it increased to 57%. Regarding eco-tourism users, those in their 20s and 30s accounted for 46% to 49%, while those in their 60s and over accounted for 16-18%. On the other hand, in the case of non-eco-tourism users, the number was 23-29% of those in their 60s or older.



In terms of residential areas, residents in Kano region accounted for 41-42% throughout the year, followed by the Chubu region. On the other hand, in the case of non-ecotourism users, the proportion of residence in the Kanto region was only 33-34%. By the way, as of the summer of 1977, the proportion of ecotourism users who live in Kanto region was only 19% and at the time 40% of the users were from neighboring areas such as Kyushu and Okinawa. A survey of the means of transportation between Kagoshima (Tanegashima, Ibusuki) and Yakushima revealed that only 25% of non-ecotourism passengers used flights, while 49~50% of ecotourism passengers used

flight. 4)、5)

When asked what the purpose of their visit to Yakushima was, 70% of ecotourism users mentioned mountain climbing, while only 3 to 40% of non-ecotourism users mentioned mountain climbing. The ecotourism program in Yakushima was centered on the rare experience of the natural environment, especially in the mountainous area, which was reflected in the results.

Regarding the number of visitors per group, in the case of ecotourism users, a small group of 2 people made up the majority (51~52%), while non-users made up only 31~37%.

Table1. Characteristics of ecotourism customers

列1	列2	列3	列4
	visitor of ecotourism	non visitor of ecotourism	comparison of summer (1997 year→2002 year)
sex	woman (55%~56%)	man (61%)	increasing of woman visitors
age	twenties and thirties(46%~49%) ages 60 and over(16%~18%)	twenties and thirties(46%~49%) ages 60 and over(23%~29%)	no changes
occupation	public employee, manufacturing industry, student,homemaker, service industry		no changes
residence	Kanto district(41%-42%) Chubu district (15%~18%)	Kanto district(33%~34%) Kyushu・Okinawa district(17%~18%)	Kyushu・Okinawa district(40%→19%) Kanto district(19%→47%)
traffic of out of island	airplane(49%~50%) high speed vessel(43%~46%)	airplane(25%) high speed vessel(52~57%)	n.a
purpose of visitation	mountain climbing(74%)	mountain climbing(26~34%)	n.a
the group number of people	1-2 people (51%~52%) more than 10people(26%~27%)	more than 10 people(38%~49%)	no big changes
packaging tour	someone who used (57~60%)	someone who used (44%~53%)	increasing rate of packaging tour utilization(43%→62%)
traffic on island	rental car(45~47%) chartered bus(20~22%)	rental car(30~35%) chartered bus (32~41%)	no big changes
accomodations	hotel (around 60%) Guest house(around 20%~30%)		decreasing rate of shelter utilization(15%→2%)
the number of accomodations on island	2~3night	1~2night	no big changes
visit destination on island	Chihiro waterfall(67%~68%) Shirohaniunsiukyoku(58%~60%) Joumon cedar(56%~57%)	Chihiro waterfall(72%~77%) Yaku cedar land(67%~75%) Kigen cedar (65%~70%)	Shiritaniunsiukyoku(40%→60%) Inaka beach(20%→38%) West forest road (16%→36%)
sightseeing except for Yakushima	someone who visited (37%~38%)	someone who visited(58%~64%)	n.a
souvenir charges	about 11,000 yen		n.a
yearly income	518-528 million yen	528-540 million yen	no big changes
annotation : With regard to visitor of ecotourism and non ecotourism, It is result of model analysis that is estimated by refering to actual situation according to the month using by result of aggregated four times of questionnaire that is conducted November,2001 February,2001 May,2002 August2002 by estimated according to the month.			
With regard to comparison of summer(1997year→2002year), We compared result of questionnaire that is conducted in August,1997 and 2002 year.			

However, looking at the percentage of groups with 10 or more visitors (Following are the group visitors), 26~27% of Ecotourism users were group visitors, although this percentage is less than the 38~49% recorded by non-users. Comparing summer 1997 and 2002, the percentage of the group of 10 visitors or more remained almost unchanged from 17% (1997) to 19% (2002) indicating that the use of ecotourism by group travelers has been relatively early and to a certain extent.

We would also like to clarify the relationship between ecotourism and package tours planned by travel agencies. Among ecotourism users, package tours accounted for 57~60%. On the other hand, only 44~53% of non-ecotourism users used package tours. Comparing the summer of 1997 and 2002, the proportion of ecotourism users who took package tours increased from 19.43% in 1997 to 62% in 2002.

The most frequently used transportation on the island was rental cars (45~47%), followed by chartered buses (20~22%). On the other hand, among non-users, the largest number used chartered buses (32~41%), followed by rental cars (30~35%).

The proportion of ecotourism users staying at hotels was the highest at 61~63%, followed by *minshuku* / pensions (24~28%) and *ryokans* (14~15%). In the summer of 1997, 15% of ecotourism users

used mountain huts and tents, but in the summer of 2002, the percentage decreased by 13 points, and the null hypothesis was rejected at a statistically significant level of 1%.

The result suggests that ecotourism users may be more likely to climb mountains on day trips than they were 5 years ago. The number of stay days on the island for ecotourism users is the highest at 2-3 nights (74~75%). The survey also found that most of the visitors who did not use the facilities stayed at least 2 nights (72~79%), with ecotourism users staying at Yakushima for about one night longer. 9) However, the percentage of long-term residents who stayed more than five nights did not reach 10% for both ecotourism users and non-users.<sup>6)</sup>

*Senpiro-Falls*, an island sightseeing spot that many ecotourism users visited, is the most popular at 67~68%, followed by *Shiratani-Unsuikyo* (58~60%), *Jomon-Sugi* (56~57%), *Okawa Falls* (52~54%), *Kigensugi-Cedar* (53~55%), and *Yakusugi Land* (50~51%). The results showed that ecotourism users were more likely to visit mountain areas and World Heritage sites than non-users. For example, while 32~39% of non-ecotourism users visit *Shiratani-Unsuikyo*, 58~60% of ecotourism users do so. The situation was similar for the *Jomonsugi* cedar tree, where only about 20~27% of non-users visited the tree while 56~57% of ecotourism visitors did.

In addition, ecotourism users were more likely than non-users to visit the Western Forest Road, where laurel forests are spreading, and the “Inakahama” Beach, which is known for sea turtles. Compared with five years ago, the percentage of ecotourism users visiting *Shiratani-Unsuikyo Gorge*, *Inakahama Beach*, and Seibu Forest Road has also increased in summer. In summary, ecotourism users preferred to visit areas with beautiful and rare flora and fauna, a trend that was stronger than five years ago.

About 11,000 yen per percent was spent on souvenirs for both ecotourism users and non-ecotourism users. There was no significant difference in annual income between ecotourism users and non-users.

Another noteworthy point was the relationship between ecotourism and package tours. Theoretically, those developed in response to the trend of alternative tourism are considered “ecotourism”. However, ecotourism in Yakushima has turned out to be more closely related to be mass tourism. Accommodation shows a high rate of hotel use, again indicating that package tours

guests are using ecotourism. From the above results, it can be interpreted that ecotourism in Yakushima exists not as an alternative tourism flow theoretically advocated, but as an optical tour of package tours.

From the above results, it can be interpreted that ecotourism in Yakushima exists as an optical package tour rather than a theoretically advocated alternative tourism stream.<sup>7).8)</sup>



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## Notice:

- 1) Hiroo **ISHIDAO**, Sponsored by the Executive Committee of the World Natural Heritage Conference (20 municipalities in 14 countries in Asia Pacific, 5 government agencies, UNESCO World Heritage Center) “1st World Heritage Conference “Yakushima” 2nd committee “World Heritage Report” on Chairman’s Report, May 18-19, 2000.
- 2) Shigemitsu **SHIBAZAKI** “Analysis of ecotourism in Yakushima,” National Museum of Ethnology, Research Report 193, February 2015, pp. 54-61. The survey period on the tourism demand side is November 2001 (hereinafter, autumn), February 2002 (hereinafter, winter), May 2002 (hereinafter, spring), and July-August 2002 (hereinafter, summer). The result of questionnaire surveys conducted at Yakushima Airport, *Miyanoura* Port, and *Anbo* port at each time were used. Regarding the summer season, the result of a similar questionnaire survey conducted in 1997 were also used to approach changes over time.
  - Shigemitsu **SHIBAZAKI**, Kunihiro **MAKITA**, Yasuhiro **YOKOTA**, Shin **NAGATA** “Impact of World Natural Heritage Registration on Local Resource Management System: A Case Study of Mountainous Area of Yakushima”, *Forestry Economy* 59 [8], 2006, pp. 1-16...
- 3) **SHIBAZAKI** and **NAGATA** 「Estimation of the Number of Tourists to Yakushima Island.」 『*Journal of Forest Economics* 138』.
- 4) It’s being put into effect by making reference to the following document about the outline of a questionnaire survey and acquisition method of

data. Shigemitsu **SHIBAZAKI**, Yusuke **SAKATA**, and

Makoto **NAGATA** “the number of annual tourists in Yakushima and estimation of sightseeing demand property-expensive stochastic method which is higher than it can be put in the isolated island”, 2003 and 1-25 page.

- 5) Shunichi **TAKESHITA**: For time series analysis, it was verified statistically whether there is a difference in tourism demand between 1997 and 2002 using  $X^2$  test and residual analysis. And we are pursuing in the text about the null hypothesis rejected at the significance level of 5.
- 6) Estimating the average number of overnight stays on the island, it was estimated that the eco-tourism tourists had 2.7 nights and the non-eco-tourism tourists had 1.9-2.1 nights.
- 7) Hiroo **ISHIDAO**, World Natural Heritage registration and the challenges of creating sustainable tourism destinations-Economic analysis of Ecotourism in Yakushima.55-social and industrial enterprise development policy in East Asia International Conference (2019.7.20, Tongji University, Shanghai, China).
- 8) Syunichi **TAKESHITA**, Estimating the annual number of tourists and tourism demand characteristics on Yakushima Island-A more accurate estimation method on remote islands.
- 9) Hironobu **BABA**, Kesayosi **KIRA** and Kunihiro **HARUTA**, Behavioral Patterns and Ways of the Climbers at the “Yakushima”. *Bulletin of the Faculty of Agriculture, Kagoshima University* No.46, 57-66pp.