Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

ACG36-01 Room:103 Time:May 21 09:00-09:15

Reproduction of isotopic signals in climate proxies with Isotope Reanalysis for 20th century

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In the present study, an isotope-incorporated GCM simulation for AD1871 to AD2008 nudged toward the so-called ”20th Century Reanalysis (20CR)” atmospheric fields is conducted. The method applies a correction to one of the ensemble members in such a way that the seasonal mean is equal to that of the ensemble mean, and then the corrected member is inputted into the isotope-incorporated GCM (i.e., IsoGSM) with the global spectral nudging technique. Use of the method clearly improves the skill than the cases of using only a single member and of using the ensemble means; the skill becomes equivalent to when 3-6 members are directly used. By comparing with GNIP precipitation isotope database, it is confirmed that the 20C Isotope Reanalysis’s performance for latter half of the 20th century is just comparable to the other latest studies. For more comparisons for older periods, proxy records including corals, tree-rings, and tropical ice cores are used. First for corals: the 20C Isotope Reanalysis successfully reproduced the d18O in surface sea water recorded in the corals at many sites covering large parts of global tropical oceans. The comparison suggests that coral records represent past hydrologic balance information where interannual variability in precipitation is large. Secondly for tree-rings: d18O of cellulose extracted from the annual rings of the long-lived Bristlecone Pine from White Mountain in Southern California is well reproduced by 20C Isotope Reanalysis. Similar good performance is obtained for Cambodia, too. However, the mechanisms driving the isotopic variations are different over California and Cambodia; for California, Hadley cell’s expansion and consequent meridional shift of the submerging dry zone and changes in water vapor source is the dominant control, but in Cambodia more direct influence of ENSO associated with Walker circulation is a primal control for isotope. Thirdly for tropical ice cores: reproduction of tropical ice cores by the model is much more difficult than for other two proxies. In addition to horizontally high resolution simulation for isotopes, consideration of isotopic fractionations associated with snow sublimation, snow melt/refreeze, and horizontal transport of snow due to blizzard are necessary.

Keywords: stable water isotope, 20th century Reanalysis, climate proxy, ice core, cellulose, coral

Japan Geoscience Union Meeting 2012
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ACG36-02 Room:103 Time:May 21 09:15-09:30

Current status of JRA-55 project

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A new generation reanalysis JRA-55 project has been processed. In the JRA-55, many problems found in the previous reanalysis JRA-25 are fixed and improved. For example, dry bias in Amazon Basin and large temperature bias in stratosphere are resolved in the JRA-55. In addition, a target period of 55 years in the JRA-55 is much longer than one of the JRA-25, and studies of long-term variability over the last half century become to be possible with the JRA-55. In JRA-55, we include a lot of observation, for example, snow depth from Russia and China, and tropical cyclone wind retrieval data, that are not used in other reanalysis, and aim at the reanalysis with higher quality as possible.

In the JRA-55 project, we are making the subset products for specialized purpose other than a main product. The one includes reanalysis JRA-55C which is specialized for climate change studies. In the traditional reanalysis, all available observations are utilized in data assimilation system to produce higher quality reanalysis products as possible. It was the effective and necessary methodology in the time that computer resources are not enough, but the available observations are fewer in the earlier time. Especially, the satellite observations are never available before the 1970s. Due to such times change of observation data, the quality of the reanalysis product is variable depending on the times. In addition, satellite observations include some bias, and the bias has different characteristics in different satellites. Because the lifetime of individual satellites is around several years, and the different bias level introduces large inhomogeneity in the reanalysis products in each several years. In general, the signal of the climate change is smaller than the noises in the reanalysis products originated from the time change observation systems, and inhomogeneity in the reanalysis products is obstacles in applying the reanalysis products to climate change studies. To achieve the homogeneous reanalysis products applicable to climate change studies, we started the JRA-55C only using upper air and surface observations which are expected to have relatively small time change.

In addition, the AMIP run is also processing with the global model used in JRA-55. It is a numerical experiment only using the boundary condition such as the sea surface temperature, and not to assimilate observation data. Using AMIP products, we can quantitatively understand characteristics of the climatology of the forecast model used in the data assimilation system, and can directly obtain how much modification is made in the data assimilation system.

Keywords: Data Assimilation, Reanalysis, Integration

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ACG36-03 Room:103 Time:May 21 09:30-09:45

Global high resolution hydrology and water resources dataset by global water resources model H08

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H08 is a global water resources model which deals with both natural hydrological processes and major human activities related to water use. H08 consists of six sub-models: land surface hydrology, river routing, crop growth, reservoir operation, water withdrawal, and environmental flow requirement sub models. Detailed description of the model formulations and results of validation can be found in Hanasaki et al. (2008a,b). A set of H08 simulations has been conducted using the best available global dataset, and comprehensive dataset on global hydrology and water use (0.5 degree longitude/latitude, daily time interval) have been obtained. All of these input/output dataset and source code of H08 is publicly available.

References

Hanasaki, N. et al., 2008a. An integrated model for the assessment of global water resources - Part 1: Model description and input meteorological forcing. Hydrol. Earth Syst. Sci., 12(4): 1007-1025.

Hanasaki, N. et al., 2008b. An integrated model for the assessment of global water resources - Part 2: Applications and assessments. Hydrol. Earth Syst. Sci., 12(4): 1027-1037.

Keywords: water resources, hydrological cycle

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ACG36-04 Room:103 Time:May 21 09:45-10:00

Coupling urban information and disaster simulations for integrated earthquake-tsunami simulation in urban areas

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The 2011 Tohoku Earthquake caused strong ground motion and tsunami in the same area, and the expected Tokai, Tonankai, and Nankai Earthquakes are possible to be an earthquake and tsunami disaster. To make effective mitigation strategies, we need to grasp the overall consequences of urban disasters under earthquake and tsunami hazard scenarios. Currently, physics based disaster simulations with city models that reflect the properties of a city are used for simulating damage of urban areas under an earthquake or tsunami hazard. In this study, we integrate such disaster simulations to perform a seamless simulation of a series of earthquake and tsunami hazard scenarios.

Such an integrated simulation has many components such as datasets of city configuration stored in the Geographic Information System (GIS) and each of the component simulations, leading to a complex structure of the simulation system. Note that we need to convert data between the I/O interfaces of each component since each interface has different formats, such as vector/raster, ASCII/binary, and big/little endian formats. Thus, the key to perform an integrated simulation is a smart way to couple information of urban areas with each of the component disaster simulations.

In this study, we couple information of urban areas and disaster simulations using a common city model. A common city model is a common dataset that stores information of an urban area. Here, we use GIS data as source of urban information, although other spatial/temporal information of urban areas obtained from Computer Aided Design (CAD) data, sensors placed in urban environment, or other resources can be used as a source. Urban information and disaster simulations are coupled by converting relevant parts of the common city model to inputs of each of the component simulations, and writing the results of component simulations back to the common city model. All data conversion is performed in full automation for application to large datasets. By using this method, we can utilize multiple GIS datasets and integrate multiple component simulations by only adding data conversion modules between the additional dataset/simulation and the common city model; we do not have to think about direct interactions between each component simulation and GIS dataset.

As an application of the developed method, we perform a simulation targeted on a coastal area of Sendai. We first construct a common city model from GIS data and perform seismic response analysis of structures. Here, we use two dimensional vector GIS data to model the external shape of buildings and Digital Elevation Map to model the ground elevation. For seismic response analysis, we model beams and columns as non-linear line elements and analyze response of structures using the one component model. The structures are excited using the observed waveform in the 2011 Tohoku Earthquake. We assume a condition for a structure to collapse and modify the city configuration accordingly. At last, we perform high resolution tsunami simulation on the original and modified city models. We use a fluid analysis code using three-dimensional analysis methods, in particular, Smoothed Particle Hydrodynamics, to compute local flows around buildings. Since such a high resolution simulation becomes large in scale, the code is parallelized using standard distributed memory parallelization methods. Results show that the flow of tsunami changes according to the modifications in the building configurations; a seamless simulation of earthquake and tsunami disasters can be performed targeted on an existing city. We plan to enhance the tsunami simulation code for analyzing destruction of buildings and flow of structural debris due to tsunami loading.

Keywords: integrated natural disaster simulation, coupling urban information and analysis, seismic response analysis, high resolution tsunami simulation

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ACG36-05 Room:103 Time:May 21 10:00-10:15

A series of quasi-global eddy-resolving ocean simulations using the OGCM

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A series of quasi-global eddy-resolving ocean simulations using the OFES (OGCM for the Earth Simulator, Masumoto et al., 2004) with horizontal resolution of 0.1 degree (˜10km), which includes a 98-year-long integration driven by monthly climatological fields of NCEP reanalysis (Masumoto et al. 2004), a multi-decadal (1950-2010) hindcast simulation with the reanalysis forcing (Sasaki et al. 2008) and a supplemental hindcast simulation with QuikSCAT wind stress forcing (Sasaki et al., 2006), have been conducted on the Earth Simulator. The simulations display oceanic mean field and variability with rich fine-scale structures such as mesoscale eddies and oceanic fronts, which are comparable to available observations, and intriguing results are emerging from the realistically simulated oceanic fields. The high-resolution ocean simulations can offer to advance our understanding of the ocean circulations and their variability.

Keywords: Ocean General Circulation Model, Eddy resolving, Quasi-global simulation

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ACG36-06 Room:103 Time:May 21 10:45-11:00

Development of a gridded temperature dataset and its application to rain/snow discrimination of precipitation.

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We created a daily mean gridded temperature dataset of monsoon Asia (15S-55N, 60E-155E) for the period of 1951-2007, with a 0.50 x 0.50 degree grid. We analyzed this dataset based on station observations collected and a quality control and interpolation system developed through the activities of the Asian Precipitation – Highly Resolved Observational Data Integration Towards Evaluation of Water Resources (APHRODITE) project. The number of stations is up to 1.5-3 times the number of stations based on the Global Telecommunication System (GTS), which have been used to obtain other gridded temperature products. The monthly means and climatology of our product are comparable to the monthly means of those products. This is the only product in Asia that has high resolution both temporally and spatially as the APHRODITE precipitation product is known for.

The ability to discriminate between rain and snow is added to the APHRODITE daily precipitation product by using daily mean temperature and relative humidity (RH) derived from a reanalysis product. We found use of the temperature product (of this study) and the RH derived from the reanalysis product to be adequate for determining whether precipitation was rain or snow. Our estimated solid precipitation amount using rain/snow discrimination for late fall to early spring (October to March) is consistent with satellite observations.

This dataset is available on the APHRODITE website (http://www.chikyu.ac.jp/precip). The combination of daily mean temperature, precipitation and rain/snow information in this high- resolution gridded format would be useful as input to river-flow models, crop models and many other situations where water resources must be estimated.

Japan Geoscience Union Meeting 2012
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ACG36-07 Room:103 Time:May 21 11:00-11:15

Recent progress of satellite precipitation products by TRMM and GPM

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The Tropical Rainfall Measuring Mission (TRMM) satellite is the first satellite mission focused on 'rainfall' observation. TRMM is a joint mission between Japan and the U.S., and continues excellent observation over about fourteen years since its launch on November 1997. The TRMM carries the world's first satellite-borne Precipitation Radar (PR) developed by Japan, in addition to conventional instruments, such as an infrared imager and microwave imager (TRMM Microwave Imager; TMI). JAXA and NASA have started to provide a new version (Version 7) of TRMM standard products since July 2011. In version 7, overall PR rain estimates have increased with compared to Version 6 product released in June 2004. PR Version 7 increased over land globally, especially over the equatorial region, while TMI Version 7 decreased significantly. Differences over the ocean were small even in Version 6, and became smaller in Version 7 over the ITCZ region. Thus, consistency of PR with TMI was improved. Moreover, unnatural angle dependence in PR over ocean disappeared and so the reliability of the PR rain estimates is considered to be increased. In addition, TRMM latent heat products were newly released as the standard products on February 2012.

The Global Precipitation Measurement (GPM) mission is composed of two categories of satellites; 1) a TRMM-like non-sun-synchronous orbit satellite (GPM Core Observatory); and 2) constellation of satellites carrying microwave radiometer instruments. The GPM Core Observatory carries the Dual-frequency Precipitation Radar (DPR), which is being developed by the JAXA and the NICT, and microwave radiometer provided by the NASA. GPM Core Observatory will be launched around February 2014. As a proto-type for Japanese GPM mission products, JAXA has developed and operated near-real-time data processing system with passive microwave radiometer (PMW) data (i.e., TRMM TMI, Aqua AMSR-E, and DMSP SSM/I) and GEO IR data and distributed rainfall products via the Internet (http://sharaku.eorc.jaxa.jp/GSMaP/). Core algorithms of the system are based on the combined PMW-IR algorithm developed under the Global Satellite Mapping of Precipitation (GSMaP) project. In order to improve sampling of observation of rainfall, the products from passive microwave imager/sounder (i.e., DMSP SSMIS) since 11 Jun. 2010 and passive microwave sounder data from NOAA-19 and MetOp-A since 1 Aug. 2011 is introduced into the near-real-time system. Currently, the near-real-time system is operated with 7 PMW data and GEO IR data. In addition, re-processing (re-collection and more elaborated algorithms) is going on. We completed the re-processing with the period during 2007-2010. The re-processing during 2000-2006 will be completed by March 2012.

Keywords: satellite, precipitation, rainfall, TRMM, GPM, GSMaP

Japan Geoscience Union Meeting 2012
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ACG36-08 Room:103 Time:May 21 11:15-11:30

Study on the air-sea interaction on the Baiu frontal zone using JCOPE2 and JCDAS

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[1]JAMSTEC/RIGC

Air-sea interaction on the Baiu frontal zone over the East China Sea were investigated using JCOPE2 (
Japan Coastal Ocean Predictability Experiment) and JCDAS (JMA Climate Data Assimilation System). The JCOPE2 has a sufficient resolution for studying correspondance with atmospheric variability (daily, about 10 km in horizontal), and makes the analysis of air-sea interaction with shorter time scale possible.

The Yellow Sea, which is the northern part of the East China Sea, has a small heat capacity because of the shallow depth less than 100 m, and has a large seasonal variability of water temperature. The significant seasonal variability of the Yellow Sea influences on the formation of the cold and warm air masses to the north and south of the Baiu frontal zone. The water temperature of the Yellow Sea is varied in association with the air masses in shorter time scale (a few days or more), and could be one of the causes of the seasonal migration of the Baiu frontal zone.

Keywords: Atmospheric objective analysis, Oceanic objective analysis, JCOPE2, JCDAS, Baiu front

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ACG36-09 Room:103 Time:May 21 11:30-11:45

Current situation of Indo-pacific ocean observation buoy arrays and its importance of the data dissemination

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[1]JAMSTEC

This presentation will introduce the current situation of the TAO/TRITON buoy array data from the Pacific Ocean and the RAMA buoy array data from the Indian Ocean. We also introduce the history of the global tropical moored buoy array from the point of view of data dissemination, and discuss the importance of data dissemination for promoting global environmental and climate science.

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ACG36-10 Room:103 Time:May 21 11:45-12:00

Long-term data on deep-sea environment obtained with JAMSTEC's cabled observatories

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Since the deployment of a cabled observatory on deep seafloor off Hatsushima Island in Sagami Bay in September 1993, more than 18 year deep-sea environmental data, such as CTD, water current on seafloor and so on, are stored in JAMSTEC. After the Southern Hyogo prefecture earthquake in 1995, cabled observatories capable of deep-sea environmental observation were also deployed off Mutoro Cape in Kochi and off Kushiro-Tokachi in Hokkaido. However, aims are mainly focused on seismological observation not only in budgetary aspect but also in other aspect, and accordingly those environmental data, some of which are open on web, have some problems in qualities and are not easy for public users to utilize, compared to those data obtained with seismometers. In addition, the cabled observatories have some problems of electrical interference among sensors and calibration that are not the problems with self-recording type mooring systems which are electrically isolated.

For example, the data of the electro-magnetic current meter of off Kushiro-Tokachi observatory have large offset that is obviously different from its calibration sheet and contain electronic noises caused by rush currents of ADCP. However, having tried removing those noises and offset by comparing data of the current meter and the ADCP, current velocity changes that indicate more than one slope collapses associated with off Tokachi Earthquake in 2003 and those associated with tsunamis of off the Pacific Coast of Tohoku Earthquake in 2011 were detected, which had not been recognized with raw data.

At off Hatsushima Island observatory, the click sounds of sperm whales were observed with a hydrophone when ADCP echo intensity in middle layers increased, which suggests the relation between the increase of the biomass and the biological activity.

Those kinds of long-term observation at fixed points on deep seafloor have rarely been achieved in the past and undoubtedly valuable. The situations coping with those problems including the trial of quality control will be reported.

This research was partly supported by JST, CREST.

Keywords: deep-sea environment, cabled observatory, off Hatsushima Island in Sagami Bay, off Kushiro-Tokachi in Hokkaido, off Mutoro Cape in Kochi

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ACG36-11 Room:103 Time:May 21 13:45-14:00

Spatial and temporal estimation of global groundwater withdrawal and depletion

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The extent of water withdrawal and its increase is a growing concern as population continues to grow and climate change affects the water cycle. Global water withdrawal grew by about 20% per decade during 1960-2000, and water scarcity is a significant condition for 1-2 billion people worldwide. Groundwater is an attractive source of freshwater consisting about one third of the global water withdrawals, and its use has increased in recent decades relative to surface water. There are reports of groundwater depletion in several areas such as Northern India, North East China and the central U.S.. However, in most of the reported areas, the whole picture of the current state is often not known. Moreover, there is a possibility that groundwater depletion has been occurring in areas that we do not even know about, as water table is inherently hidden underground. In order to grasp the global picture of groundwater withdrawals and to assess future global water resources, it is necessary to comprehend the past and current withdrawal trends and distribution. However, consistent data on global groundwater withdrawals are very difficult to come by. While physically based models are useful to fill data gaps, their estimates of groundwater withdrawal vary significantly among studies. In this study, we estimated total and groundwater withdrawal for 1960-2000 in grid scale (1.0 degree) primarily based on statistical data. In order for our estimates to have good agreement with country scale statistical data, we collected data from a wide range of database and literature and prepared a country scale time series withdrawal database. By combining our results of groundwater withdrawal with groundwater recharge, we estimated groundwater depletion (nonrenewable groundwater withdrawal).

First, total water withdrawal for each sector was estimated by downscaling country statistics using proxies such as irrigation water demand simulated by a global water resources model, infrastructure area and population for the agricultural, industrial and domestic sector, respectively. Groundwater withdrawal was also estimated based on country scale statistics collected from a wide range of database and literature. Then, we separated the country scale groundwater withdrawal into each sector using sectoral ratio of groundwater withdrawal from statistical data, and then distributed each of them using the estimated total water withdrawal as a proxy for each sector. Finally, groundwater depletion was estimated by subtracting simulated groundwater recharge from groundwater withdrawal. Groundwater recharge is simulated by a global-scale land surface model coupled with a groundwater model.

Validation of the estimated groundwater withdrawal in USA and India for specific years showed relatively good correlation. Compared to previous studies, our estimated groundwater depletion showed higher values in Southern India, Turkey, Spain, Morocco and Northern Algeria. With these results, we aim to contribute to revealing the global picture of groundwater resources and its sustainability.

Keywords: groundwater withdrawal, groundwater depletion, H08 model, MATSIRO

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ACG36-12 Room:103 Time:May 21 14:00-14:15

The Earth Temperature Changes of the Last 110 Years and it's Relationship to the CO2 Level and Solar Activity

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The earth air temperature change (T) in the past 110-years was analyzed using NASA/GISS temperature data base (1896-2010), and got the result as shown in Fig. 1. Among 7646 observation points, only 473 points whose jurisdiction population is less than 1,000 were used to remove the heat island effects which may give the effect to the air temperature.

The air temperature changes during this period can be classified into 4 periods. Temperature ascended in the 1st and 2nd periods, and descended in the 3-th and 4-th(begun in 2003 and continued to the present days) periods. The temperature change T can not be explained only by the concentration change (C) of the atmospheric carbon dioxide.

The solar activity change (S) was introduced to explain such T.SIDC sunspot data base (1750-2010) was used. We employ a assumption that the radiated energy is constant(E) during one sun spot cycle. Based on this assumption, the velocity of the upward transportation of energy in the convection layer inside the Sun is in proportion to 1/AT (we call it solar activity endpoint S.A.I). (AT has been used as The Solar Activity Index in some articles:1.2).S.A.I of 1896-2010 has high correlation (more than 0.7 correlation coefficient) with T, and shows the pattern similar to 1-4 periods of above-mentioned T.T seems to have a delay (o) to S.A.I., which satisfies the cause-effect rule.

A parameter "x" is introduced to estimate contribution of S and C to T where x is a contribution of C to T and 1-x is that of S. A composed model temperature Tcomp is now defined as $Tcomp(t,x)=x*Tc(t)+(1-x)*Ts(t)$ where Tc and Ts are basic pattern of the change of C and S. The physical transformation coefficients are necessary to find Tc and Ts from C and S.A.I, but such transformation coefficients can not be obtained under the present research level. Therefore, Tcomp is calculated by the pattern matching method. Because there is a delay (o) in Tc and Ts as mentioned above, o is involved in this calculation process. Thus, the optimum solution which gives the maximum correlation coefficient on (x, o) plane is searched. Fig. 2 shows an example of relation between Tcomp and x.

In this example, correlation coefficients are 0.85-0.91 when x equals to 0.3-0.5.The air temperature change pattern of 1-4 period speared in Tcomp is expressed comparatively well. This is only an example, but the optimum solution will be searched from now on.

Supplement:

We got some interesting findings by this research as shown below.

1) The comparatively clear period of 40-60 years appeared in S.A.I. A period of the lowest S.A.I appeared precisely during the Dalton Little Ice Age and that of the highest appeared just after that age.

2) The mechanism that a change of S.A.I brings an air temperature change is not apparent by the current science. According to V.Hoyt (1993), the irradiation is 1368-1373W/m2, and the width of change 5W/m2 is 0.4%.

The temperature change corresponding to this width is 1.1K, when we consider the mean temperature of the earth.

3) The minimum S.A.I after 1750 is 0.06 (cycle5) and the maximal is 0.13 (cycle8).The former is in about 1835 after the Dalton Little Ice Age and the later is in about 1800 during that age. The difference of about 2 times is unexpectedly.

4) After 1970, the concentration of carbon dioxide (C) increased rapidly. However, the sun activity (S.A.I) also increased rapidly (over in about 2003). We cannot deny that this accidental phenomenon confused our scientists.

5) When we assume S and C are impulse, T is response, and the global climate system (E) is transfer function, E may include amplify and delay function (for example, in the case of an annual change, there is delay of about two months). It may be an interested problem of the future sun - earth system science.

Keywords: Global Temperature, Solar Activity, CO2 Level

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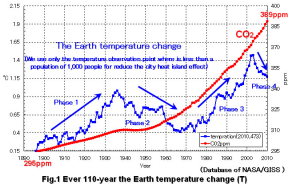

Fig.1 Ever 110-year the Earth temperature change (T)

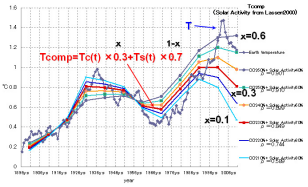

Fig.2 Observation temperature (T) and synthetic temperature (Tcomp), τ = 0 years

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ACG36-13 Room:103 Time:May 21 14:15-14:30

Study of aerosol climatology using data collected by SKYNET network

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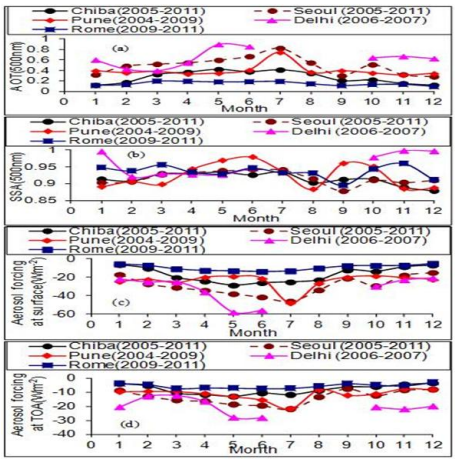
Aerosols are known to play important roles on atmospheric heat budget and climate change through their direct and indirect effects. The roles on aerosols on climate change are still not clearly understood due to associated uncertainties in their physical, chemical, and optical characteristics. The characteristics of aerosols are known to vary spatially and temporally. Therefore, spatial information of aerosol characteristics is very important to clearly understand aerosol direct and indirect effects on climate change. SKYNET network (http://atmos.cr.chiba-u.ac.jp/), which has several monitoring stations at different parts of the Earth, including Asia and Europe, is continuously measuring data related to aerosols, clouds, radiation, and meteorology. One of the key instruments of the SKYNET network is the sky radiometer (manufactured by PREDE Co. Ltd., Japan). This instrument has the capacity to give columnar information of aerosol, cloud, and water vapor. In this study, we use data of sky radiometer to study aerosol climatology of different atmospheric scenarios.

Figure 1 shows the monthly variations of aerosol (a) optical thickness (AOT) at 500nm, (b)single scattering albedo (SSA) at 500nm, (c) radiative forcing at the surface, and (c) radiative forcing at the top of the atmosphere (TOA) for some urban sites of SKYNET network. As shown in Figure 1(a), AOTs at 500nm are different depending on the observation site. Regardless of the observation site, it is likely that AOTs at 500nm are higher in the summer season. This may be due to the effect of atmospheric water vapor. Figure 1(b) also shows dissimilar SSA values at 500nm for different observation sites. The monthly mean SSA values were observed to fall within 0.85 to 1.0. Those data resemble different aerosol sources depending on the observation site. Figure 1(c) shows aerosol radiative forcing at the surface. Similarly, Figure 1(d) shows the aerosol forcing at the TOA. As shown in Figures 1(c) and 1(d), monthly aerosol forcings at the surface and TOA were different at different sites. They were due to the different values of AOT and SSA, which can be seen in Figures 1(a) and 1(b). Though the observation times are not same for all of those sites, it can be suggested that the aerosol radiative characteristics of urban atmospheres cannot be represented by a single set of optical parameters.

Keywords: Aerosol optical thickness, single scattering albedo, aerosol radiative forcing, aerosol heating rate



Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

ACG36-14 Room:103 Time:May 21 14:30-14:45

A Global Environmental Database Project at the CGER in National Institute for Environmental Studies

NAKAJIMA, Hideaki[1]*, SHIRAI, Tomoko[1], ZENG, Jiye[1], MAITA, Eiichi[1]

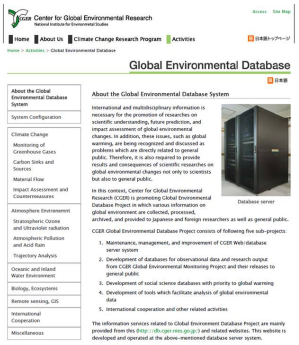
[1]National Institute for Environmental Studies

We, the Office for Global Environmental Database, at the Center for Global Environmental Research (CGER), in National Institute for Environmental Studies (NIES), has been constructing and providing databases on several topics related to earth's global environment since early 2000s. The tasks of our project are divided into 5 major categories: 1) To construct, maintain, and renew database servers which provides our databases. 2) To construct databases and provide public/related researchers with data which were gathered by earth environmental monitoring project in our institute. 3) To construct databases on social environmental sciences related to global warming. 4) To develop convenient tools to analyze earth environmental datasets. 5) To achieve international cooperation on database-related issues.

Currently, we are providing the following databases from our server in NIES (number of databases): A) Databases on global warming: Related to greenhouse gases observations (7). Related to carbon sources/sinks (8). Related to material flow (10). Related to effect and measure of global warming (3). B) Databases on atmospheric environment: Related to stratospheric ozone layer/UV (6). Related to air pollution/acid rain (10). Related to trajectory analysis (1). C) Databases on marine/lake environment (8). D) Databases on biology (3). E) Databases on satellite remote sensing/GIS (7). F) Databases on international cooperation (7). G) Databases on other topics (6).

Current status and future plan of database project in NIES will be presented. Also, a new project related to DIAS/GRENE which started in FY2011 will be presented.

Keywords: database, global environment, global warming, ozone layer, DIAS, GRENE



http://db.cger.nies.go.jp/en/

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

ACG36-15 Room:103 Time:May 21 14:45-15:00

Change of user access to JAMSTEC Document data before and after the 2011 off the Pacific coast of Tohoku Earthquake

FUKUDA, Kazuyo[1*], Ruri Funakoshi[1], Shin Miyagi[2], Hideaki Saito[1], Makoto Nakamura[2], Akira Sonoda[1]

[1]DrC/JAMSTEC, [2]Marine Works Japan Ltd.

In order to disseminate research and development achievements of the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), JAMSTEC has provided back issues of various publications in PDF archived at the Global Oceanographic Data Center[1)] via the website "JAMSTEC Document Database" since April 2002. This site has been succeeded by the new website "JAMSTEC Document Catalog[2)]" since November 2011. The documents in each publication cover great deal of fields such as deep-sea living, climate change, and solid earth. As of February 2012, seven different kinds of 390 public relations and four different kinds of 1975 research papers were provided in this website. Recently, we at the Data Research Center for Marine-Earth Sciences (DrC) have analyzed traffics for over 10 websites operated by DrC as part of user needs assessment. The two websites described above have been also analytical objects. In this presentation, we will report the change of user access to JAMSTEC document data focusing on user behavior before and after the 2011 off the Pacific coast of Tohoku Earthquake.

For the traffic analysis, we used the server logs from the "JAMSTEC document database", except access from JAMSTEC domain, from April 2010 to November 2011. The logs were processed by using a web analytics reporting tool AWStats[3)] to extract traffic parameters such as number of visits and search phrases. Furthermore, text mining applied to search phrases used at search engines. Term frequency and collocation about search phrases were analyzed using by a Japanese morphological analyzer MeCab 0.98[4)], a statistical software R 2.13.1[5)] and a package software RMeCab 0.94[6)].

Number of daily visits has increased suddenly on March 12th, 2011, the day after the earthquake. The six-month average number of both visits and unique visitors after the earthquake was 1.4 times larger than before the earthquake. After the earthquake, the six-month average number of entries to the site via direct access or bookmark, external pages and search engines was 1.2, 1.6 and 1.3 times larger than before the earthquake, respectively. This indicates that the number of both new and repeat users has increased after the earthquake. According to an analysis of search phrases, the frequency of term "jishin", which means "earthquake" in Japanese, has been ranked in the top 5 during the whole period. It shows that earthquake has been one of the user's major concerns in daily life. The term frequency of "jishin" from March to April 2011 was seven times higher than before the earthquake, and the frequency after May remained three times higher than before the earthquake. Frequently collocated terms with "jishin" in each phrase from March to April 2011 were "mekanizumu", "kyodai" and "hassei", which mean "mechanism", "mega" and "occurrence" in Japanese, respectively. The rapid rise of frequency of terms related earthquake seems to influence by newspaper and television coverage. The number of access to the "Blue Earth", which is a marine-earth science information magazine aimed to above high school student, has markedly increased after the earthquake. The titles of six documents include the term "jishin" and the bodies of the other five documents include terms related to earthquake among top twenty most accessed documents within the "Blue Earth". These results suggest that providing documents online is essential for outreach activity.

References

1) Sonoda, A., M. Nakamuda, H. Miyagi and F. Shidara, 2005, In the case of information processing and management at Global Oceanographic Data Center (GODAC)/JAMSTEC, Journal of Information Processing and Management, 48(4), 214-219.
2) http://www.godac.jamstec.go.jp/catalog/doc_catalog/index_en.html
3) http://awstats.sourceforge.net
4) http://mecab.sourceforge.net
5) http://www.R-project.org
6) http://rmecab.jp/wiki/index.php?RMeCab

Keywords: Web analytics, Text mining, Tohoku Earthquake, Outreach

Japan Geoscience Union Meeting 2012
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ACG36-P01 Room:Convention Hall Time:May 21 15:30-17:00

seismic precursors in the ionospher, atmosphere and groundwater

ONDOH, Tadanori[1*]

[1]Space Earth Environment Laboratory

Precursory phenomena of M7.2 Hyogoken-nanbu earthquake in the morning of Jan.17, 1995 are investigated using avairable time-variations of ionospheric foF2 and foEs, seismic clouds, radio noises and Radon concentration around the epicenter before this earthquake.

The earth crust consisting largely of the granite is rich in the Radon which escapes into the atmosphere, and is chemically inert, but soluble in the water.

As the contact surface of rock grains with the groundwater increases due to the decrease of grain size by microcracks, Radon atoms are released more into the groundwater. The groundwater Radon concentration in an well of the Nishinomiya city, east of Kobe city began to increase from 78 days before the M7.2 Hyogoken-nanbu earthquake of Jan 17, 1995. Then, the Radon concentration returned to the normal level.

In general, the Radon concentration in the water and atmosphere is in reverse proportional to the water temperature and air one, the rapid decrease of groundwater Radon concentration down to the minimum suggests an arrival of hot or warm matter such as the magma coming up to the observed region from the deep origin. Therefore the rapid decrease of groundwater Radon concentration down to the minimum suggests an arrival of warm matter such as the magma from a deep origin in the Earth.

Keywords: Earthquake, Precursor, Ionosphere, Atmosphere, Groundwater

Japan Geoscience Union Meeting 2012
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ACG36-P02 Room:Convention Hall Time:May 21 15:30-17:00

Adjustment of a spaceborne DEM for use in floodplain hydrodynamic modelling

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[1]The University of Tokyo, [2]University of Bristol, [3]Tokyo Institute of Technology, [4]The Ohio State University

Precise Digital Elevation Models (DEMs) are required for the accurate modelling of floodplain hydrodynamics. The accuracy of currently available spaceborne DEMs however is hindered by a variety of errors which reduce the flow connectivity between river channels and the surrounding floodplains. Here we introduce a new algorithm for adjusting a spaceborne DEM which utilizes the information from a prescribed drainage networks dataset. The algorithm is designed to remove all the pits in the spaceborne DEM caused by vegetation canopies, sub-pixel sized structures, and random radar speckles while minimizing the amount of modification required for removing the pits. The proposed algorithm was applied to the SRTM3 DEM with reference to the drainage network information in the HydroSHEDS flow direction map. With consideration of the systematic errors in the SRMT3 DEM, small channels connecting floodplains were successfully implemented into the adjusted DEM. The accuracy of the adjusted DEM was validated using hydrodynamic simulations with the LISFLOOD-FP model in a middle reach of the Amazon River. The simulated water surface elevations and flooded areas with the adjusted DEM shows better agreement to observation data when compared to the results from the original SRTM3 DEM. The flow connectivity ensured by the DEM adjustment algorithm is found to be essential for representing realistic water exchanges between river channels and floodplains in hydrodynamics modeling.

Keywords: DEM adjustment, Floodplain Hydrodynamics, Pit Removal, Flow Connectivity, SRTM, HydroSHEDS

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

ACG36-P03 Room:Convention Hall Time:May 21 15:30-17:00

Detection of chlorophyll fluorescence using the oxygen A-band

KIKUCHI, Nobuhiro[1*], Tatsuya Yokota[1], Yukio Yoshida[1]

[1]National Institute for Environmental Studies

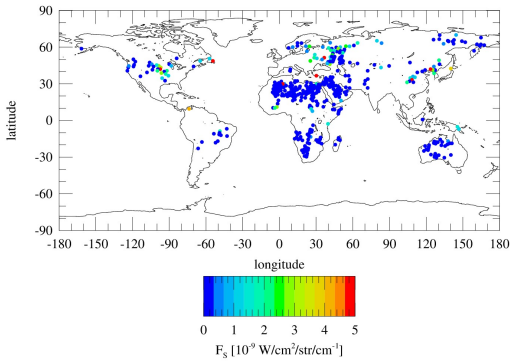
A part of solar radiation energy absorbed by plants is used for photosynthesis. The remaining energy is dissipated into heat, or emitted as fluorescence. The solar-induced chlorophyll fluorescence is directly linked to the instantaneous photosynthesis activity of plants. Therefore, global measurements of chlorophyll fluorescence from space will provide detailed information on carbon fixation. Moreover, if concentration of atmospheric carbon dioxide can be measured simultaneously with chlorophyll fluorescence, we would obtain a unique data set for better understanding of global carbon cycle.

Chlorophyll fluorescence is emitted in the wavelength range of 0.65-0.8 micron, which overlaps oxygen A-band around 0.76 micron. The radiative intensity is estimated to be 2 $mW/m^2/str/nm=10^{-8}$ $W/cm^2/str/cm^{-1}$ at wavelength of 0.76 micron. The TANSO-FTS on board the Japanese Greenhouse Gases Observing SATellite (GOSAT), launched successfully in January 2009, records oxygen A-band spectra with resolution of 0.2 cm^{-1}. Although the primary purpose of recording oxygen A-band spectra is to correct the effects of aerosol and cirrus on the amount of greenhouse gases such as carbon dioxide and methane measured at 1.6 and 2 micron wavelengths, they can also be used to detect chlorophyll fluorescence. In fact, the noise level of TANSO-FTS is about $2x10^{-9}$ $W/cm^2/str/cm^{-1}$ in the oxygen A-band, which is lower than the intensity of chlorophyll fluorescence.

We have developed an algorithm to derive from oxygen A-band spectra radiative intensity of chlorophyll fluorescence, which is modeled as isotropic emission from the ground surface. The parameters simultaneously derived with chlorophyll fluorescence are ground albedo, surface pressure, temperature shift (deviation from meteorological data, assuming uniform in vertical direction), aerosol optical thickness, and a zero-level offset seen in GOSAT TANSO-FTS L1B spectra. The zero level offset is caused by detector signal non-linearity, and cannot be corrected by a simple filling-in method using Fraunhofer lines.

The Figure shows intensity of chlorophyll fluorescence derived from cloud-screened data during July 26-28 in 2009. The results are preliminary, and have not validated yet. Although the data are sparse, several points may be pointed out to discuss validity of out result. First of all, chlorophyll fluorescence is not detected in desert regions such as Sahara. In addition, strong emission is detected in North America, Eastern Europe, Central Africa, and Southeast Asia. The global distribution of strong fluorescence emission is consistent with the result of Joiner et al. (2011) and Frankenberg et al. (2011), who derived fluorescence emission from GOSAT spectra with a filling-in method of Fraunhofer lines. Further data analyses are now underway to obtain monthly mean and seasonal variation of chlorophyll fluorescence in global scale, as well as simultaneous retrieval of atmospheric carbon dioxide concentration.

Keywords: carbon cycle



Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

ACG36-P04 Room:Convention Hall Time:May 21 15:30-17:00

Database of cloud top height and its application to the tropical disturbances

NISHI, Noriyuki[1*], HAMADA, Atsushi[2], OHIGAWA, Masanori[3]

[1]Graduate School of Science, Kyoto Univ., [2]AORI, Tokyo University, [3]RISH, Kyoto University

Lookup tables for estimating the cloud-top height (CTOP) and visible optical thickness of upper-tropospheric clouds by the infrared brightness temperature (TB) at 10.8 micro m (T11) and its difference from TB at 12 micro m (DT11-12) measured by geostationary satellites are developed (Hamada and Nishi 2010, JAMC). These lookup tables were constructed by regressing the cloud radar measurements by the CloudSat satellite over the infrared measurements by the Japanese geostationary multifunctional transport satellite MTSAT-1R and MTSAT-2. The CTOP of the last two years is available at http://database.rish.kyoto-u.ac.jp/arch/ctop/, and the previous data is also available at the website linked there. The data have good precision for cirrus clouds (optical depth $>$ ˜3) that have large DT11-12 values and are suitable for analyses of cloud systems with well-developed cirrus clouds. We made a correction for the satellite view angle and can offer the data over almost all tropical regions where the satellites can observe (20S-20N, 80E-160W for MTSAT-1R and 85E-155W for MTSAT-2).

We introduce applications of this data to tropical large-scale cloud system.

(1) We analyzed zonally elongated cloud bands extending 3000 km around ITCZ during 2007. It was first concentrated in the ITCZ, then spread meridionally into the two parallel zonal cloud bands and kept moving meridionally away. We examined detail of the separation with our CTOP data and Global Satellite Mapping of Precipitation (GSMaP; Kubota et al. 2007, IEEE Trans. Geosci. Remote Sens.) data: precipitation estimation dataset made with microwave radiometers including TRMM/TMI. In order to investigate the relation between clouds and large-scale circulation, the information of the cloud height is indispensable. We succeeded to find out that the cloud top is kept in the high altitude while moving meridionally.

(2) Cloud clusters with 1000-km scale in the tropics mainly consist of nimbostratus and cirriform clouds adjacent to cumulonimbi and their top height is very high: 12-16 km. However, the clusters with rather large TB value but having 1000-km scale are sometimes observed around the dateline in the ITCZ region. They keep their cloud top height during 1-2 days. From ordinary TB images, it is not sure whether they have thinner optical depth or they have lower cloud top. Here, we analyzed, with CTOP data, the lifecycle of such a cloud cluster of which CloudSat fortunately observed a part. CTOP estimation and CloudSat direct observation have similar top height at that part of the cluster. As our CTOP data have continuous time coverage, we traced the cluster and found that the cloud cluster kept 5-9 km top height during the lifetime over one day.

Keywords: cloud top height, MTSAT, CloudSat, IR split window

Japan Geoscience Union Meeting 2012
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ACG36-P05 Room:Convention Hall Time:May 21 15:30-17:00

Dataset in Center for Environmental Remote Sensing (CEReS), Chiba University

HIGUCHI, Atsushi[1*]

[1]Center for Environmental Remote Sensing

Center for Environmental Remote Sensing (CEReS) of Chiba University was established in 1995. CEReS's task is "establishment of remote sensing technology and application for environmental studies", thus CEReS has a kind of responsibilities for satellite data archiving & releasements. I will introduce CEReS's current data archiving status. In addition, I hope to discuss requests for our center.

Keywords: satellite dataset, environment, public

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

ACG36-P06 Room:Convention Hall Time:May 21 15:30-17:00

Comprehensive observations of atmospheric environment at Cape Hedo Atmosphere and Aerosol Monitoring Station

SHIMIZU, Atsushi[1*], TAKAMI, Akinori[1], SATO, Kei[1], HATAKEYAMA, Shiro[2]

[1]National Institute for Environmental Studies, [2]Tokyo University of Agriculture and Technology

National Institute for Environmental Studies (NIES) have operated Cape Hedo Atmosphere and Aerosol Monitoring Station (CHAAMS) in Okinawa, Japan since 2005. In CHAAMS atmospheric constituents, aerosols, and parameters related to both radiation and meteorology are measured continuously or intermittently with various collaborating universities and research / governmental organizations. An advantage of observation in Okinawa is that the influence of local pollution from mainland of Japan is suppressed to reveal the regional scale variation of atmospheric environment in East Asia. CHAAMS is one of contributing observatories in UNEP/ABC, and also served as a open platform in the research society of atmospheric environment. In this study, various observational items in CHAAMS including surface continuous monitoring, filter sampling, remote sensing are introduced and importance of maintaining such station in the atmospheric science is discussed.

Keywords: aerosols, radiation, minor constituents, East Asia, monitoring

Japan Geoscience Union Meeting 2012
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ACG36-P07 Room:Convention Hall Time:May 21 15:30-17:00

Long-term in-situ dataset by Phenological Eyes Network for ecological remote sensing

AKITSU, Tomoko[1*], Kenlo Nishida Nasahara[1]

[1]Faculty of Life and Environmental Science, University of Tsukuba

It is possible to acquire the terrestrial ecosystem information on the global scale by satellites. Besides, it is important to verify satellite data affected by clouds, aerosol, etc. on ground truth. Phenological Eyes Network (PEN) is founded so as to verify satellite data on the ground observation in 2003. We get the spectrum radiation data, the automatic digital fish-eye photograph and so on at 26 PEN sites.

The spectrum radiation is measured upward and downward not only upper canopy but also under canopy for more approximate verification on the ground. The spectrum radiation data as well as satellite data can derive vegetation indices (VI), and the automatic photographs provides background information useful for interpretation of the changes of the VI from the ecological standpoint. Moreover, the photographs can detect important phenological events such as the leaf flush, autumn color, leaf fall, and snow coverage. The sky photographs can detect the cloud coverage, which is critical in the quality assessment of satellite data. Additionally, the time series analysis using digital RGB number of the photographs as well as spectrum radiation or satelite data can automatically and quantitatively detect the phenology and the other ecological events on the resolution finer than satellites.

We hope these in-situ monitoring network will contribute to establishing more accurate and comprehensive frameworks of modelling and satellite remote sensing of terrestrial ecosystem.

Keywords: terrestrial ecosystem, phenology, spectrum radiation data, ground observation, long-term, ground verification

Japan Geoscience Union Meeting 2012
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ACG36-P08 Room:Convention Hall Time:May 21 15:30-17:00

The DIAS data release and its cross-disciplinary usage

KINUTANI, Hiroko[1*], Toshiyuki Shimizu[2], Toshihiro Nemoto[1], Masatoshi Yoshikawa[2], Masaru Kitsuregawa[1], KOIKE, Toshio[1]

[1]The University of Tokyo, [2]Kyoto University

For 5 years from 2006FY, by collaboration of information science technologies and various kinds of earth environmental technologies, we have constructed a data infrastructure of the Data Integration and Analysis System (DIAS). DIAS is one of a project of a global-scale integrated observation and monitoring system (the Earth Observation and Ocean Exploration System), which is a part of national basic 'Earth Observation Promotion Strategy'. In DIAS we have integrated the earth observation data, numerical model outputs, socio-economical data and information in order to create knowledge enabling us to solve earth environment problems. From 2011FY, we started 'a program of earth environment information integration and fusion'. We continue to extend and enhance the DIAS functions. As our purpose of this program, we will construct an information infrastructure by collaboration of multi-disciplinary users integrating of extreme big data in order to create new value.

From October 2010, we have released data of DIAS with 'Document-metadata', describing about dataset in English and Japanese. Anyone can use the DIAS data discovery system by accessing http://dias-dss.tkl.iis.u-tokyo.ac.jp/ddc/finder, and can download data files of 176 datasets through the system. User registration and data policy agreement is required before file download.

The data in DIAS is classified into 4 categories:
1) Numerical simulation outputs for the purpose of research,
2) Satellite data for the purpose of research,
3) Datasets created by DIAS researchers,
4) Datasets created at related projects supported by DIAS.

The main datasets are 1) model outputs of CEOP, JP10, JRA25 and K-1, 2) CEOP Satellite data, CZCS SeaWiFS Choloro-phyll data, 3) Mirai CTD data, Ocean Reanalysis data, Global map of interannual response of normalized difference vegetation index (NDVI), Triton buoy data, 4) CEOP In-situ data, AWCI In-situ data, GPV data, and so on.

The DIAS has provided the computation place enabling seamless usage of these dataset for researchers participating in this project, and they have gained many research outputs combining Satellite data, numerical model outputs and In-situ data.

On the other hand, for 1.5 year data release period, there were 50 person new user registrations and data downloading 300 times. The frequent download datasets are AWCI In-situ data, Global map of interannual response of normalized difference vegetation index (NDVI), Mirai CTD data and JRA25. Interest of released data of DIAS does not always motivate user to download data. Therefore the number of top page viewing of the DIAS data discovery system is about 4,500 times, and the number of document-metadata viewing is about 12,000.

We provide to display the distribution matrix of the dataset in the DIAS data discovery system in order to enhance cross-disciplinary usage of its data by specifying the axis GCMD Science keyword, area social benefits GEOSS, the GCMD data set as a platform. We found that the vast majority of users select the cell matrix instead of input search keywords in order to search the list to find the appropriate data.

Generally, in the catalogue search of the data center, the search system often provide functions to specify, period, region and keywords to users. Users can narrow down (or exclude) the search results using facet search function. In DIAS, as for increasing the number of released datasets in future, for improving our search function, we think we should add another axis of matrix of datasets, add facet search function, and add search results ranking.

We think adding these functions are necessary for cross-disciplinary dataset search. In order to implement these functions, we need to describe many aspects of attributes of datasets. We will plan to enhance our developed document-centric metadata creation system and the data downloading functions.

Keywords: DIAS, Release of Geoscience data, cross-disciplinary usage, Satellite data, Model output data, In-situ data

Japan Geoscience Union Meeting 2012
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ACG36-P09 Room:Convention Hall Time:May 21 15:30-17:00

In-situ data archiving for the GEOSS/AWCI and WCRP/AMY

TAMAGAWA, Katsunori[1*], Eiji Ikoma[1], KINUTANI, Hiroko[1], Misa Oyanagi[1], Tetsu Ohta[2], KOIKE, Toshio[2], Masaru Kitsuregawa[3], MATSUMOTO, Jun[4]

[1]EDITORIA, The University of Tokyo, [2]Dept.Civil Eng., The University of Tokyo, [3]IIS, The University of Tokyo, [4]Dept. of Geography, Tokyo Metropolitan University

This is to introduce two types of international in-situ data archive research projects which are ongoing in Asia. The one is Global Earth Observation System of Systems (GEOSS)/Asian Water Cycle Initiative (AWCI), and the other one is World Climate Research Programme (WCRP)/Asian Monsoon Years (AMY).

The objectives of GEOSS/AWCI is to develop an information system of systems for promoting the implementation of integrated water resources management (IWRM) through data integration and sharing and improvement of understanding and prediction of the water cycle variation as a basis for sound decision making of national water policies and management strategies (http://monsoon.t.u-tokyo.ac.jp/AWCI/) .

The long-term goal of WCRP/AMY is to improve Asian monsoon prediction for societal benefits through coordinated efforts to improve our understanding of Asian monsoon variability and predictability (http://www.wcrp-amy.org/).

The basis for the GEOSS/AWCI and WCRP/AMY collaborative framework is the mutual consensus among participating countries, international organizations and individual participating and partner projects that defines data sharing and exchanging policy and responsibilities for data processing, management and archiving.

The Data Integration and Analysis System (DIAS) which was launched in 2006 as part of the Earth Observation and ocean Exploration System, provides cooperative opportunities for constructing GEOSS/AWCI and WCRP/AMY data archives, and developing data integration and analysis functions (http://www.editoria.u-tokyo.ac.jp/dias/).

The purpose of this poster is to provide the introduction of the GEOSS/AWCI and WCRP/AMY and their data archiving status which used data uploading system, data quality control system and metadata registration system under the framework of DIAS.

Keywords: GEOSS/AWCI, WCRP/AMY, DIAS, in-situ data, Quality Control, Water Cycle

Japan Geoscience Union Meeting 2012
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ACG36-P10 Room:Convention Hall Time:May 21 15:30-17:00

Prospects for Arctic Data Archive

KAWAMOTO, Haruko[1*], Hironori Yabuki[1]

[1]National Institute of Polar Research

Arctic Research by Japanese researchers has been carried out all the time from the last century. The result of their research includes many irreplaceable data, such as observation time series, sample, and its analysis, which each researcher got in the field. Since researcher and organization have had those data in their keeping by their way, many data has not managed and kept systematically.

Now, a new ”Arctic Data archive System (ADS)” was launched on purpose to collect, manage and open some arctic data supported by Green Network of Excellence (GRENE), Rapid Change of the Arctic Climate System and its Global Influences (a tentative English title). ADS can search various keywords using metadata which are related with a one-to-one correspondence. This schema fits some format of typical Earth environment data, and we plan additional schema.

We suppose the subject of our collection as the present or the past observational data and model or simulation data. First of all we ask a participant view by questionnaires and know some potential request.

This project is supported by Green Network of Excellence (GRENE): Rapid Change of the Arctic Climate System and its Global Influences (a tentative English title).

Keywords: Arctic Research, observation, model, metadata

Japan Geoscience Union Meeting 2012
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ACG36-P11 Room:Convention Hall Time:May 21 15:30-17:00

The Earth Temperature Changes of the Last 110 Years and it's Relationship to the CO2 Level and Solar Activity - Methods

SHANG, Yeqian[1], SUGAI, Michiyo[1*], OGAWA, Katsurou[1]

[1]Nagoya Sangyo University

Firstly the authors referee the database of NASA/GISS "Surface Temperature Analysis (GISTEMP)". This database includes records of temperatures at 7364 observation points in the world (Figure 1 and 2). However, very few data were recorded to analyze the global temperatures before 1896. Then the temperatures recorded after 1896 are employed in the following calculations. At the same time, the authors utilize those at 473 observation point only. This is because these 473 observation points are located in the city whose population is no more than 1000. The other points are most likely located in urban city area where the temperatures may be influenced by heat island effect. Though the most of observation points are in such urban cities, the areas of the urban cities are about less than 1- 3 % in the world. Then it is not appropriate to utilize the records of the temperature concentrated in the urban cities. The cities whose population is no more than 1000 now would have had the less population in the last 110 years.

The global temperatures are estimated by the data at 473 observation points after 1896 as follows

1)The changes of temperature DT(i,j) of i year from the i-yeara at i point are calculated as follows

$$DT(i,j)=T(i,j)-T(i,j-1) \quad (1)$$

2)Then the average e of the changes DTj are calculated in i year as follows

$$DTj=\sum_{j=1}^{n} DT(i,j))/n, \text{ here } n = 473 \quad (2)$$

3)Then the global temperature of Tt of i year is calculated referring 0 degree at 1896 as follows

$$Tt=\sum_{i=1896}^{t} DT(i)) \quad (3)$$

4)Now the global temperature T(^)(t) of i year is estimated by as the 11 year running average as follows

$$T(\hat{})(t)=(T(t-5)+T(t-4)+...+T(t)+...T(t+4)+T(t+5))/11 \quad (4)$$

Figure 3 shows the estimated global temperatures T(^)(t) for the last 110 years. The figure also shows the change of CO2 level C(t) (not CO2 emission) and solar activity index S.A.I S(t). S(t) is estimated based on the data from SIDC. S(t) is calculated as reciprocal of period of sunspot activity DTS(t)

As shown in the figure, T(^)(t) increase after 1896, starts decreasing after 1940, start increasing after 1970 and decreeing after 2003

On the other hand, C(t) is only increasing in the last 110 years. This shows that C(t) cannot explain well the change of temperatures in the last 110 year. However, the pattern of the changes of S(t) is well accordance with that of T(^)(t) though some time delay cans exits.

The authors calculate the some indexes as follow and the results are shown in the one other paper submitted to the same symposium

$$tc(t)=a0+a1*C(t) \quad (5)$$

$$ts(t)=b0+b1*S(t) \quad (6)$$

$$T(\hat{})(t)=Tcomp(t,u)=x*Tc(t)+(1-x)*Ts(t-u) \quad (7)$$

Keywords: Global Temperature, Solar Activity, CO2 Level

ACG36-P11 Room:Convention Hall Time:May 21 15:30-17:00

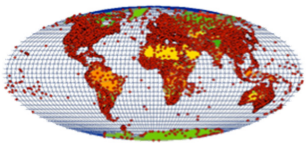

Fig.1 The temperature Database of NASA/GISS,7364 places,1896-2010

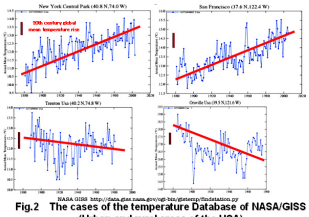

Fig.2 The cases of the temperature Database of NASA/GISS (Urban and rural areas of the USA)

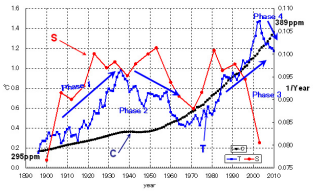

Fig.3 The CO2 Level and the solar activity and global temperature(1896-2010)

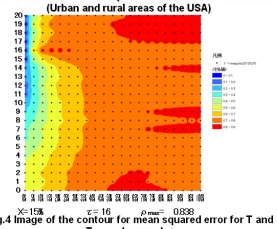

Fig.4 Image of the contour for mean squared error for T and Tcomp by x and τ