

Advocating For The World's Future Generations And To Protect All Living Creatures, Present, And Future In The Kim Stanley Robinson's "The Ministry For The Future"

Rahamath Nisha S¹, S. Horizan Prasanna Kumar²

Abstract

In this paper, the cultural and political factors of climate change have been discussed thoroughly along with the mode¹ of climate change. The event coincidence analysis of climate change and disasters are also explained. The impact of "The Ministry for the Future" and the impact of future climate change have been discussed comprehensively. The Spatio Temporal analysis of the ocean wave case study is further given here. In the literature review, the cultural and political elements that are related to climate fiction have been mentioned. Also, the way culture and political factors are related to climate and the future by the eco-experts has been involved. In addition, the model of climate change puts concentration on the direct application of both the global climate model and the regional climate models as an input to anticipate the role of universal climate change. Whereas, in the methodology part, the focus of the researcher for implementing the research is concentrated on the influence of the specific climate fiction novel on the individuals to think about nature and the future more critically. In the results and findings, it is observed that the influence of climate fiction on individuals in walls a broad range. This kind of science fiction novel put a huge threat on the human scientist. Also, it links the current times along with the future extremely adequately.

Keywords: Spatio Temporal analysis, science-fiction, climate change, ecosystem, ecology.

1. Introduction

The current situation has brought unimaginable changes in human lives and national economics. It is significant to understand the way, how the living creatures are being affected by climate changes. It is important to protect and should teach the future generation to protect and take care of the living creatures. The climate changes occurs because humans are not protecting the nature day by day creating more problems by affecting the environment. India faces very high summer in many states there are pollutants which is affecting the health all these because planting of trees is not being done. People are using plastic carry bags throwing garbage in the river and side of houses. "There have never been a more urgent need to restore damaged ecosystem than now. Ecosystem restoration aims to prevent halt and reverse the degradation of ecosystem on every continent and in every ocean, it will only succeed if everyone plays a part. Being united can be easy to work for the living creatures" (Robinson, 2020). Earth is surrounded by every part of creatures so if humans do not take care of plants and animals then the environment will get destroyed.

"The climate crisis, the catastrophic decline of ecosystem and species and now the global pandemic show beyond doubt that humanity has no choice but to respond vigorously to

¹Research Scholar, Department of English and Foreign Languages, SRM Institute of Science and Technology, Kattankulathur, India.

²Assistant Professor, Department of English and Foreign Languages, SRM Institute of Science and Technology, Kattankulathur, India

Scopus Author Identifier: 57206178443

these combined threats. Nature needs a bailout. It is important to remember that there can be no separating climate action from the larger planter's picture. Nature feeds clothes and shapes culture and faiths and forges the identity. It essential to act more broadly and holistically across many fronts to secure the health of the planet on which all life depends. Changes affecting the ecosystem put multiple species in the danger of extinction. Ecosystems are deeply connected to one another if the ecosystem of nature is automatically dependent on living creatures and will get harmed" (Shaviro, 2020). So as the people are living on this earth the living creature also should live as freely as they should not get afraid that they will get killed by the humans. Human beings forget about their climatic situations in daily life because people are busy in their own world harming natural calamities. Forests are also important in the lives of people which provides various materials for daily life. Without all these, people cannot survive and "almost half of the species live in forest thus destroying forest would lead to the destruction of the ecosystem at large in a way that treats other people reflects personality the way people treat the environment reflects who they are" (Bump, 2022). Therefore, this paper has mentioned about the "Ministry for the Future" that reflects the climatic changes in the world.

2. Literature review

2.1 The cultural and political factors of climate fiction

Climate fiction is perhaps found considerable for many causes. "The Ministry for the Future", the literature clearly aims at climate change, provides understanding into the principled and genial development of this incomparable conservation emergency, shows the present political situation that obstructs the execution of global climate change, analyses how risk results and provokes society and ultimately performs a vital part in making the understanding of climate change (Schneider-Mayerson, 2018). Overall, in this manner, it provides a "cultural-political" intend and experimental substitute for interacting "climate change". Such as, one of the quotes of the novel states "The dead hand of the past clutches us by way of living people who are too frightened to accept change" (Bump, 2022).

When eco experts and other researchers are fascinated by "climate fiction" for a number of causes, unexpressed in much of the consideration of this type is an opinion or maybe a wish that it is specifically vital because of its "instrumental value". Researchers and society are seeking to get their communication across different factors of the global warming controversy; hence, fiction is an unexploited way of accomplishing a means of stealing some urgent issues into the awareness of the public (Milner and Burgmann, 2018). However, some have advised against looking at the global climate change novel as eco disinformation, admonishing that eco disparagement is not the scholarly censorious division of the "Intergovernmental Panel on Climate Change".

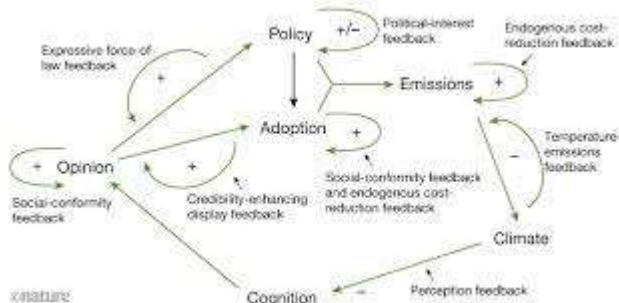


Figure 1: Cultural factors of climate change
(Source: Milner and Burgmann, 2018)

Climate novel's so-called competence to operate as fiction and influential form of ecological inducement is a vital component determining the keenness about its activation. In its public-attentive initiation, practical ecocriticism uses the matter of public-response

hypothesis, a set of condemnations that improved over the past few years (Whyte, 2018). Accompanied by critics, the public-response establishment expressed a maximum anti-formalist level, disagreeing that the definition of phrasing is completed by its audience. Another quote mentions a concern about the environment as “What's the monetary value of human civilization? Trying to answer that question proves you are a moral and practical idiot”.

Though many iconic audience-response experts did not handle observational study, their consideration of the audience has caused the present concern in empirical analyses on the response of research and representation, often concentrated on understanding, influence, and presented initially in records (Bernstein and Hoffmann, 2018). In accordance with this significance, this research expresses the types of matters that many eco experts have been engaged with, like the part of the school, influence, and position, as well as the censorious issues that different social researchers are concerned with like the different feedback of progressives and classicists, and the capability of ecological actions to invigorate practical discussions and impact performance (Duan et al. 2019). However, a reader-feedback hypothesis has been altered out of consideration in some rules to fictional theory, and the section on the public-feedback hypothesis has been renewed with a section on eco-disparagement.

Therefore, this concern in public has been obtained by researchers in gender exploration, queer research, decoding studies, and psychological discretion studies (Stevenson et al. 2018). In order to acknowledge the audience's reactions, the conception of eco condemnation, ecological communication, and rational mindset is utilized. Concepts that are introspectively ensuing in any four important compositions i.e. "temporal, spatial, social, and hypothetical" extend to more inferior interpretations, which are comprehensive and distinct, whereas distinguished interpretations are theoretical (Ide et al. 2020). Low-level interpretations of the outcomes of "climate change" have been ascertained to drive upper degree of matters and better justifications to tackle behaviors to ease “climate change”.

2.2 Model of Climate Change

Mostly, universal climate models and local climate models' outputs are slanted, which obstructs the direct usage of both global climate model and “regional climate models” inputs to estimate the significance of global climate change on "hydrological methods" (Bernstein and Hoffmann, 2018). Hence, there is a requirement to rectify these data before they can be utilized for "regional impact studies". Various unfair rectification procedures are used to amend regional and global climate model output. Although, the dimension of the research catchment is not equal to the geographical determination of the user data of both regional and global climate models (Duan et al. 2019).

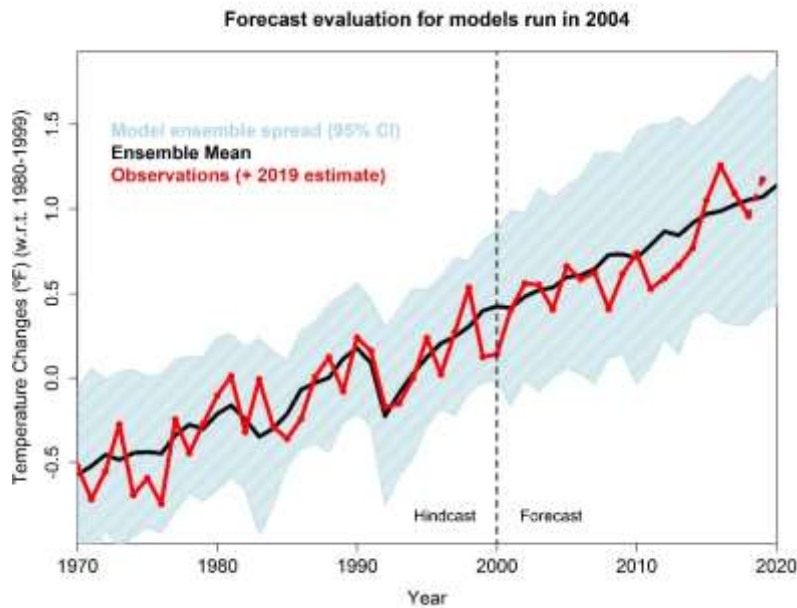


Figure 2: Forecasts of climate model

(Source: Cantell et al. 2019)

From the regional climate model data, the allocation mapping approach and the deviation scaling approach were utilized to rectify trends in the rainfall and minimum and maximum temperatures, accordingly. The quote “Ideology, n. An imaginary relationship to a real situation” tries to make a link among society and environment. These procedures executed an accurate estimation based on the "split sample test" (Cantell et al. 2019). Although, it must be acknowledged that all unfair correction approaches upgraded the raw regional climate model affected rainfall and highest and lowest temperatures.

For six extra global climate models, a "delta change approach" has been exercised to rectify diagonals of the global climate model affected rainfall and highest and lowest temperatures. Instead of using the global climate model simulations of upcoming circumstances, the "delta change approach" utilizes the dissimilarity between the global climate model affected traditional and future circumstances for the confusion of the collected data.

2.3 Event coincidence Evaluation for climate change and natural calamities

An ECA was carried out in the past to decide the link of various disasters, engaging the latter's existence against the dearth of a provided tragedy type in a crisscross cell at a particular time step. Event coincidence analysis is a "Boolean approach" of connection for exponential time series, hence, this approach is specifically dominant and functional for hypothesizing the “statistical alliance” between too many disasters and maximum climate actions. Every grid cell, the providence among the "disaster time series" was certified to find their overreliance (Christopoulos et al. 2020). A risk development trial was performed, the privileges the indication correspondence rate to demonstrate a risk development instigation connection and enacts a "trigger trail" on the basis of the discharge coincidence to observe indicator connection.

The indicator coincidence degree shows the percentage of A-type actions that results concurrently with a single B-type situation. An elevated rate for precursor providence is perhaps demonstrated as a precarious type-A event improved by a single type-B event, while a high rate for stimulating “coincidence” perhaps be demonstrated as an elevated likelihood of a type-B occurrence moving toward a type-A occurrence (Ebi et al. 2021). The analytical importance of a coincidence was verified by many erratically disarranged visualizations, with the whole research done for the "R software" platform. In the event of coincidence analysis, the existence and unavailability of data by documentation application

on time are not adjusted as various disaster occurrences in the similar grid cell were evenly affected by the documentation work.

3. Material and Method

The basic method is adopted in terms of environmental factors and the economy when a complex system might be researched in an integrated way because it might be somehow created by human activities and the imbalance is affected also by the carbon cycle. It is a large description, or it might be a huge research system in terms of identifying the forest and that real time cycle of the earth and the influence matter which has the greatest storage potential (Patra, 2021). While identifying this, a proper influences creation factors of production by the human creation or effected by the human activities and the data collection for the qualitative data collection process as well as other factors of the methods in terms of identify the proper description of the large activities related to the environmental influences which are directly led to hydrological factors of production. Directly influences the living species on earth which is mostly dependent upon the imbalance system of survival of a human being some places it needs to be affected through atmosphere but on the other hand hydrological cycle is an important factor which directly affected the water imbalance situation of earth (Suhadolnik, 2022). Due to this reason the data collection is an important process and the method which is used to collect the data related to all affected was he's of living species and the problem finding method of collection because without the concrete solution it cannot be assigned a role of a research for the betterment of the environmental factors.

It is designed to perform in terms of beneficial of the environmental species which are hydrochloric affected areas in terms of supporting role by analysis the different quality data of the different places which are come under the Thailand areas and international researchers or the professionals who have accuracy in terms of determining the objectives after the verify the appropriate result and questions. The professionals also need proper identical data from the quality data sources because the data collection is a directive solution finding method and the changes of weather events as well as the attraction of global warming are also an important cause and affection of the century which are mainly used in the term greenhouse of the society of forest (Constantino and Weber, 2021). This multinational absorbed of solar energy heat on the planet rapidly produced the warming or global warming which is unusual historical planet and major affected climate changing process is comes out the factories and the rational activities which are released from chemical effect from the different kind of factories is great important points of the professionals to be reducing approach and need to be reducing for the ocean or forest affect point of view (Gilbert and Hadfield, 2022). As well as a lot of work has been done in terms of quality data collection from the various sources which is mainly the numeric changes of the frequency and the percentage of the standard solution in terms of analyzing factors of mean and median mode of division demographically help to transparent understanding data sources of the numbers of affected numbers of household of the members and the other factors of relating the location and the occupation of the social economic factors of production.

4. Results and findings

4.1 Influence of “The Ministry for the Future” Climate fiction

Analyzing the effect of “climate fiction” on the readers is a dangerous enterprise, as the class involves a broad range of styles and groups. These 19 tasks involve the following groups: realistic literature, thriller, science fiction, near, speculative fiction, and so on. This works or is arranged in the current past, present, and future (Christopoulos et al. 2020). Their writers promote conflicting outlooks on the accountability for change of climate, its probable negative impacts, and the suggested reactions. Nevertheless, the functions of contemporary fiction are contrasting to all the other types in their anticipated concentration on the change of climate and their declaration that it denotes a huge risk to the human

scientist and non-humans. It is for the link with the present along with the future also. While the reactions of every work are dissimilar, a very number of themes appear.

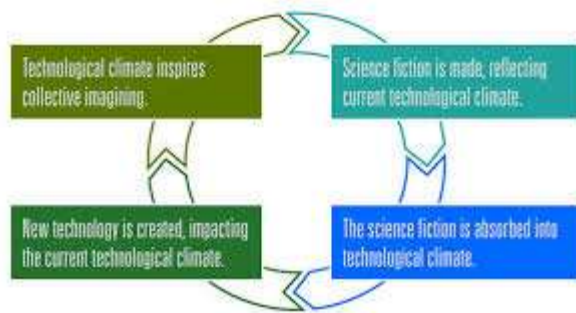


Figure 3: Science fictions on Future

(Source: Ebi et al. 2021)

Among the COVID-19 outburst, the continuous changes of the climate, and even the social and political distress accompanying the election of the American President of that year, the universe was frightened by so many criticalities and the crisis is continuous that it is extremely hard to predict the future with adequate hope (Ebi et al. 2021). The prolific science fiction writer of “The Ministry for the Future” given a mission and vision for the future in which in case some individuals work hard it would not be distress being the result. A maximum number of readers were interested in the worth of climate fiction such as “The Ministry for the Future” novel as a measure for permitting the perception of probable features of climate.

An IT manager from the Tennessee register that regarding Naomi Oreskes’s “The collapse of western civilization” discovering the way Western civilization was being destructed in the 21st century was an extremely powerful encounter for him (Caminade et al. 2019). The person was a priest of the signs of change to the climate in the past yet stated that “it was more theoretical” than before. Now, whilst fiction, the novel has created individuals more aware of what the universe can be in the future. The visualized comparison for the importance of climate fiction Square periodically invoked in the description of the readers, as in case the probable features, once unclear, are visible and vivid now.

The readers, after the influence of the science fiction of “The Ministry for the Future”, state that it should bring climate change into concentration as real life, corporal impact as an outcome of real-life, and corporal avoidance. The book not only explains the disastrous negative impacts of the warming planets but also provides the steps that humanity should take to reduce those (Xiao et al. 2020). It is obviously an optimistic story regarding automotive and political creativity. With an immediate effect of the novel, the readers got a contrasting outlook regarding the economic system that has brought the natural environment at present to the tipping point, and regarding the way, it can get out of it. Since the novel is for the policy grind, it not only describes policy but also does comprehensive evolution of the economic and capital policy.

One of the reasons for which the novel was extremely right from the point of view of the writer is that human individuals have a critical time visualizing the future absolutely contrasting to the current times. With the influence of the novel, climate change and the concerns of this topic appears to be more realistic, emerging, and similar to the readers than it was before (Schneider-Mayerson, 2018). Despite these facts, it is extremely critical to state that the “Ministry for the Future” novel is a full success as it can be critical for the readers that are non-specialists to acknowledge it.

Also, it is evident that the purpose of the novel was to make the post-capitalist universe order appear not just in a credible and practical manner, it also to significantly give advantage to humanity and the universe. Through the novel, the vast issues of the climate crisis can be explained like: humanity has given huge millennia of momentum in changing and rising huge proportion of biomass of the earth to the needs of humans (Milner and Burgmann, 2018). It is not just a linear procedure and frequently has not been aware. Of

all, even if the readers that were not struggle to visualize the climate features in the past, the novel could be unforgettable and extremely impactful on the mind.

4.2 Impact of future Climate change

While taking into consideration only climate change, the findings of the study manifest that change in the mean per annum rainfall may have huge effects on the availability of water in various territorial areas (Whyte, 2018). A rise or diminish in the mean per annum rainfall may also outcome in a huge rise in the streamflow and in the snatch of flow that has become external overflow, sideways flow, and baes flow at the time of transformations in the ET are competitively minor. However, the slightest rise in rainfall is probable to have a huge effect on the balance of water. More remarkable effects on the balance of water can be perceptive in case the transformations in the mean per annum rainfall and higher than 10%. In that, the effects on streamflow and other related areas of flow that become snatch run-off, little slow and base flow can be twice the transformations in rainfall. Following that, the transformations in the snatch of flow becoming the exterior run-off, lateral flow, and base flow could be higher under the scenarios of climate change than the senior use of change in land use (Stevenson et al. 2018). These outcomes are also seen in the outcomes of other surveys and research in the past. The increasing temperature is the reason for the rise in the probable fly-off, that may have an impact on the mean per annum ET as because of the rise in the accessible energy.

However, the results of the study discovered that the transformations in the per annum ET are probably denoted by transformations in the yearly rainfall, in which the differences of ET follow the contrast of rainfall. Thus, a rise in the ETA is found throughout the rainy season, while a huge reduction in ET is discovered in the summer season (Ide et al. 2020). These results are in accordance with other scholars that condemned that the transformations in the fly of a decision by the stabilization among precipitation and the demands of evaporation. Even though there is a definition of climate change as the transformation in the components of water balance, yet each driver has a particular denotes to the alteration of water balance.

Under the collaboration of land use and the scenarios of climate change, the transformations in the yearly fly offer are probably attributed to the changes of land use, while the transformations in the yearly baseflow are probably attributed to climate change. Various scholars are evaluated changing effects of anticipated future transformations in climate on the components of water balance (Chen et al. 2019). The outcome is manifest that, specifically, climate change can outcome in the transformation of the component of water balance, yet it is more prominent changes will happen in case the drivers of land and climate have collaborated. The changes in climate have threatened regional, and social-economic advancement.

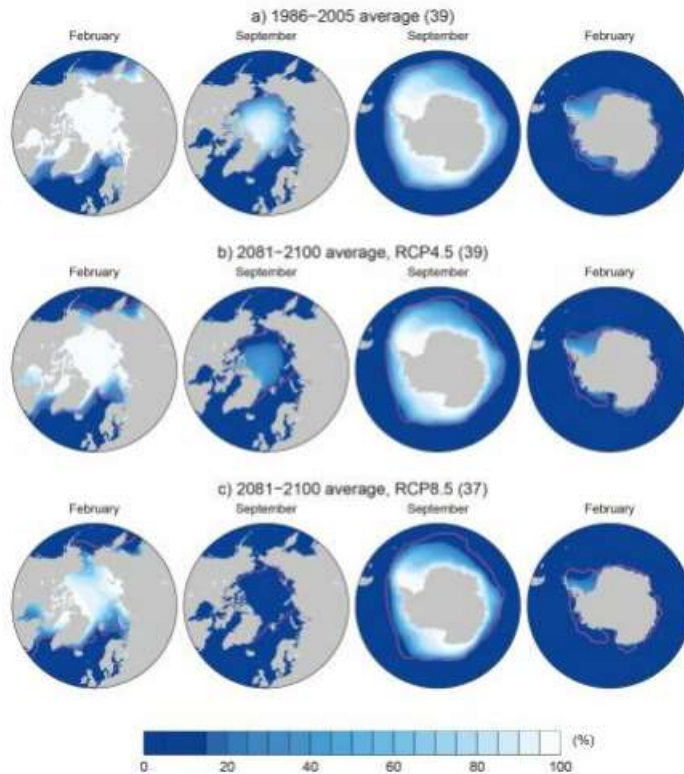


Figure 4: Future of Climate Change on World
(Source: Clerici et al. 2019)

Various researchers had condemned in the past that climate change had decreased the production of rice, outcoming from the warming climate along with a diminished in the farming area. While various models of climate had manifested inconsistent types of transformation for future rainfall, all the models of climate show the same direction of transformation for the highest and lowest temperatures. Despite this fact, there are contrasting magnitudes (Clerici et al. 2019). Also, various studies in the past had manifested that various disasters were led by climate change. It is increasingly valued that universal warming can denote various natural calamities, yet smoothly attaining an agreement on the role has been evasive.

In reference to epidemics, the short-come examinations had manifested that the increasing temperature is probable to raise the probability of diseases, while the current study is applying the historical data of long the period had further discovered that the prevalence of those epidemics might be dependent on skills. Various investigations for the recommendation that universal warming have influenced disasters in the past (Wang et al. 2021). The reactions of disasters to the changes in climate may be compatible at the multicultural scale due to the effect of climate change at that level on disasters or mostly continental themselves. Yet the disasters Mishu a diversified reaction to the climate change over various regions because of the interaction of the climate with the features of land and ocean.

4.3 Developments in Spatio Temporal Analysis to Climate change

Even though the research areas of temporal and “spatial data mining” are comparatively mature, STDM is a rising field of computer science. The key lead for such a rise is the advancement in the data sets of spatula temporal and the linked challenges of the real world. Widely collaborating, STDM initiated in the manner of extending the capability of temporal to the issues of spiritual determining, or cooperation for space in the application of the “temporal data mining” (Liu et al. 2020). The original addition is rather an organic

one provided the huge accessibility of the time spent on territorial information. allegedly, an individual meeting of the context of statute temporal of the information as constraints for understanding the algorithm of discovery.

Expert limitations have been the origin of knowledge algorithms discovery as it has the probability to enhance the scalability of a model, accuracy, and interpretability (Ning et al. 2018). In a similar way, an individual meeting of the information of spatula temporal as the expert limitations on the orthodox algorithms of learning. However, a constrained outlook cannot be accepted for most of the existing algorithms provided the powerful presumption such an approach has on the origin of the information or the process of data generation (Hu et al. 2018). In this context, a whole new generation of algorithms of learning needs to be initiated to construct for the data and issues STDM is attempting to acknowledge. In this context, it is exposed to a wider variety of applications of STDM to climate.

4.4 Spatio Temporal Analysis for Ocean Eddies observation

The in-depth case study for the patterns of mining in constant climate data obtained through the Spatio temporal analysis in the past points out some of the issues and probable manners to acknowledge them. Almost like that must fear, the oceans also encounter their own cyclones and internal variableness. The “kinetic energy” of the ocean is controlled by the climatology variability, a degree of 10 to 100 kilometers over days (Zhang et al. 2020). The climatology variability is probably involved waves of linear Rossby as the eddies of the nonlinear ocean. Far from the atmospheric cyclones, it is on the origin of huge physical and botanical functions. In differentiation to the waves of linear Rossby, the revolving of the nonlinear counterflow transports boost, mask, nutrients along with salt and other chemical factors, efficiently influencing the circulation of the ocean distribution of water on a large scale and biology.

Therefore, acknowledgment of the counterflow variability and transformation over time is of huge significance for the anticipated marine biodiversity along with the atmospheric and cinnamon of land. The eddies and Omnipresent in both time and area, yet independently recognizing them is critical because these are not the elements transforming within the environment, rather these are the cyclist and including through a constant area (Cetina-Heredia et al. 2019). To recognize and keep track of these elements, the climate scientist needs to restore to mining the signature eddies of spatial and temporal on the variety of variables of the ocean such as SST and ocean color. The issue is highlighted further provided the insufficiency of baseline information creates any learning innovation and supervision.

Whilst there coexists a huge literature on orthodox algorithms object tracking, a comprehensive structure of work for observing the user-defined factors in constant climate data is still inadequate in spite of the exponential rise in the volume of this information. The understanding of the spatio temporal analysis of the dynamics of ocean Teddy has increased remarkably with the arrival of the satellite measuring system (Bueso et al. 2020). Before that, marine scientists depended specifically on the case studies applying drifting floats in the ocean together detail data regarding individual ladies just as cyclical speed, amplitude, and profiles of salinity. With the huge availability of satellite information, the temperature and color of the ocean surface have been applied to recognize the ocean eddies depending on the signature on those areas.

While these areas are affected by the activity of eddies, there is an extra phenomenon, such as winds of the near-surface, that impacts them also. This effectively made the Eddie data difficult in these data areas. More currently, the SSH observation from the radar measuring systems of satellite emerged as the more efficient suited approach for examining the dynamics of Eddie on a universal scale provided the intimate connection of SSH to the activity of ocean Eddie (Du et al. 2019). Eddies are basically categorized by their cyclical direction. The cyclonic eddies revolve anticlockwise and vice versa. As an outcome, the cyclonic eddies generate a reduction in SSH, while the other creates a rise in the SSH. Such effect permits the scientists to recognize the ocean eddies in the satellite data of SSH where the cyclonic eddies are perceived as close lineation consequential SSH aberration.

The case study further discussed that there were some basic criticalities that appeared at the time of mining the data on climate. At first, because of the huge natural variability in universal SSH data, the activity of discovering the global arrangement of parameters is critical to evaluating the data (Mourre et al. 2018). For instance, the mean and average of the data yield are extremely perceptual because of the high level of organic variability of spatial and temporal factors. Secondly, unlike the orthodox data mining, in which the objects were comparatively well stated, the SSH data or probable to huge noise and imbalance, making it critical to compare the meaningful patterns of eddy from spurious encounters and errors of measurement.

Thirdly, even though the eddies basically have the shape of an ellipse. The manifestation of the shape in graded SSH information is comparable depending on the latitude. This is because the stretch contortion of the anticipating convex coordinates into the plane. As an outcome, an individual cannot limit eddies by formation (Jamet et al. 2019). Fourthly, the heights and size of the eddies differ by latitude, which creates a universal adoptable eddy. Therefore, the application of a sole universal threshold would clear various relevant approaches in the current statical assortment. A more minute issue is that eddies can patent themselves as regional minima included in a huge background of negative or positive anomalies creating various characteristics unnoticeable.

Whereas, incorrect positives are another problem, as other areas such as the waves of linear Rossby or the fronts can pretense as the features like an eddy in SSH data. at last, provided the universal and omnipresent type of eddies, and learning needs to be unsupervised. One of the measures to examine the performance of eddy recognition and tracing algorithms is to apply the data field studies in which the floats and ships corporally sit on the top. However, these data sets can only give unreliable evidence (Ning et al. 2018). Despite these issues, a more inconvenient issue is that the major number of autonomous eddy recognition schemes take the feature of four-dimension presentation of eddies and evaluate that data traditionally in either time or space basis, efficiently initiating extra uncertainty.

5. Conclusion

The discussions made in this paper guess a wider review of a few of the similar features of climate data together with the sample of application of STD. based on a few of the data presented in this paper, there may be various orthodox concepts of data mining that may require to be rethought and the discussions also give exploration to the new utilization within the climate data of statue Temple. One of those rethinking may act with the significance of examining. The issues of quantifying statistical importance in climate utilization stems from both the nature of exploratory work along with the autocorrelation in the information.

Whilst the orthodox randomization examinations may also address a few of the concerns from the multiple hypotheses examined, there is a huge requirement to initiate a randomization test on statue Temple in which the randomization process does not break down in hidden features of data such as autocorrelation. The paper has further evaluated the separate and collaborative effects of anticipated future changes in climate on the balance components of water. The results in this paper manifest that climate change can outcome in transformations in the component of water balance, yet there are huge, pronounced transformations that may happen in case the drivers are collaborated in specific from the mean yearly streamflow.

As soon as the BAU scenario is misplaced by the CON scenario, the mean yearly streamflow, and exterior run-off diminish by approximately 10% while the mean yearly base flow and evaporation by approximately 8%. on the contrary, the qualitative examination of climate fiction recommends that literature can be extremely efficient at permitting or compelling individuals to visualize the potential futures and take into consideration the fragility of the society and ecosystem. While, it may not give a remarkable role in convincing the skeptics to reconsider their situations, eat me efficiently nudge the concerned liberals. In this case, the novel, "The Ministry for the Future" has

extremely healthy individuals to are concerned for the future of the environment and climate changes.

Reference List

Bernstein, S. and Hoffmann, M., 2018. The politics of decarbonization and the catalytic impact of subnational climate experiments. *Policy Sciences*, 51(2), pp.189-211.

Bueso, D., Piles, M. and Camps-Valls, G., 2020. Nonlinear PCA for spatio-temporal analysis of Earth observation data. *IEEE Transactions on Geoscience and Remote Sensing*, 58(8), pp.5752-5763.

Bump, J.F., 2022. *Climate Change, PTSD, and Cultural Studies*. Book Review: Robinson (2020). *The Ministry for the Future: A Novel*. London: Orbit. ISBN: 978-0316300162.

Caminade, C., McIntyre, K.M. and Jones, A.E., 2019. Impact of recent and future climate change on vector-borne diseases. *Annals of the New York Academy of Sciences*, 1436(1), pp.157-173.

Cantell, H., Tolppanen, S., Aarnio-Linnanvuori, E. and Lehtonen, A., 2019. Bicycle model on climate change education: Presenting and evaluating a model. *Environmental Education Research*, 25(5), pp.717-731.

Cetina-Heredia, P., Roughan, M., Liggins, G., Coleman, M.A. and Jeffs, A., 2019. Mesoscale circulation determines broad spatio-temporal settlement patterns of lobster. *Plos one*, 14(2), p.e0211722.

Chen, F., Chen, J., Huang, W., Chen, S., Huang, X., Jin, L., Jia, J., Zhang, X., An, C., Zhang, J. and Zhao, Y., 2019. Westerlies Asia and monsoonal Asia: Spatiotemporal differences in climate change and possible mechanisms on decadal to sub-orbital timescales. *Earth-science reviews*, 192, pp.337-354.

Christopoulos, S.R.G., Skordas, E.S. and Sarlis, N.V., 2020. On the statistical significance of the variability minima of the order parameter of seismicity by means of event coincidence analysis. *Applied Sciences*, 10(2), p.662.

Clerici, N., Cote-Navarro, F., Escobedo, F.J., Rubiano, K. and Villegas, J.C., 2019. Spatio-temporal and cumulative effects of land use-land cover and climate change on two ecosystem services in the Colombian Andes. *Science of the Total Environment*, 685, pp.1181-1192.

Constantino, S.M. and Weber, E.U., 2021. Decision-making under the deep uncertainty of climate change: The psychological and political agency of narratives. *Current Opinion in Psychology*, 42, pp.151-159.

Du, Y., Song, W., He, Q., Huang, D., Liotta, A. and Su, C., 2019. Deep learning with multi-scale feature fusion in remote sensing for automatic oceanic eddy detection. *Information Fusion*, 49, pp.89-99.

Duan, H., Zhang, G., Wang, S. and Fan, Y., 2019. Robust climate change research: a review on multi-model analysis. *Environmental Research Letters*, 14(3), p.033001.

Ebi, K.L., Vanos, J., Baldwin, J.W., Bell, J.E., Hondula, D.M., Errett, N.A., Hayes, K., Reid, C.E., Saha, S., Spector, J. and Berry, P., 2021. Extreme weather and climate change: population health and health system implications. *Annual review of public health*, 42, p.293.

Gilbert, S.F. and Hadfield, M.G., 2022. Symbiosis of disciplines: how can developmental biologists join conservationists in sustaining and restoring earth's biodiversity?. *Development*, 149(13), p.dev199960.

Hu, S., Sprintall, J., Guan, C., Sun, B., Wang, F., Yang, G., Jia, F., Wang, J., Hu, D. and Chai, F., 2018. Spatiotemporal features of intraseasonal oceanic variability in the Philippine Sea from mooring observations and numerical simulations. *Journal of Geophysical Research: Oceans*, 123(7), pp.4874-4887.

Ide, T., Brzoska, M., Donges, J.F. and Schleussner, C.F., 2020. Multi-method evidence for when and how climate-related disasters contribute to armed conflict risk. *Global Environmental Change*, 62, p.102063.

Jamet, Q., Dewar, W.K., Wienders, N. and Deremble, B., 2019. Spatiotemporal patterns of chaos in the Atlantic overturning circulation. *Geophysical Research Letters*, 46(13), pp.7509-7517.

Liu, X., Huang, Y., Xu, X., Li, X., Li, X., Ciais, P., Lin, P., Gong, K., Ziegler, A.D., Chen, A. and Gong, P., 2020. High-spatiotemporal-resolution mapping of global urban change from 1985 to 2015. *Nature Sustainability*, 3(7), pp.564-570.

Milner, A. and Burgmann, J.R., 2018. Climate fiction: A world-systems approach. *Cultural Sociology*, 12(1), pp.22-36.

Mourre, B., Aguiar, E., Juza, M., Hernandez-Lasheras, J., Reyes, E., Heslop, E., Escudier, R., Cutolo, E., Ruiz, S., Mason, E. and Pascual, A., 2018. Assessment of high-resolution regional ocean prediction systems using multi-platform observations: Illustrations in the western Mediterranean Sea. *New frontiers in operational oceanography*, pp.663-694.

Ning, J., Liu, J., Kuang, W., Xu, X., Zhang, S., Yan, C., Li, R., Wu, S., Hu, Y., Du, G. and Chi, W., 2018. Spatiotemporal patterns and characteristics of land-use change in China during 2010–2015. *Journal of Geographical Sciences*, 28(5), pp.547-562.

Patra, I., 2021. Mapping the Contours of the Future: An Ecosophical Explication of the Elements of Good and Bad Anthropocene in Kim Stanley Robinson's *The Ministry for the Future*. *Review of International Geographical Education Online*, 11(10), pp.123-140.

Robinson, K.S., 2020. *The Ministry for the Future: A Novel*. Hachette UK.

Schneider-Mayerson, M., 2018. The influence of climate fiction: an empirical survey of readers. *Environmental Humanities*, 10(2), pp.473-500.

Shaviro, S., 2020. Optimism in the Face of Catastrophe: Kim Stanley Robinson's *The Ministry for the Future*. *Studies in the Fantastic*, 10(1), pp.108-114.

Stevenson, K.T., Nils Peterson, M. and Bondell, H.D., 2018. Developing a model of climate change behavior among adolescents. *Climatic Change*, 151(3), pp.589-603.

Suhadolnik, A., 2022. *The Blue Marble: An Essay on the Commonality of Human Experience. In China and the World in a Changing Context* (pp. 75-81). Springer, Singapore.

Wang, H., Wang, Y. and Yuan, Q., 2021. Validation and spatiotemporal analysis of MODIS multi-angle atmospheric calibration aerosol products in China from 2008 to 2016. *Remote Sensing Technology and Application*, 36(1), pp.217-228.

Whyte, K.P., 2018. Indigenous science (fiction) for the Anthropocene: Ancestral dystopias and fantasies of climate change crises. *Environment and Planning E: Nature and Space*, 1(1-2), pp.224-242.

Xiao, D., Li Liu, D., Wang, B., Feng, P., Bai, H. and Tang, J., 2020. Climate change impact on yields and water use of wheat and maize in the North China Plain under future climate change scenarios. *Agricultural Water Management*, 238, p.106238.

Zhang, Z., Zhang, Y., Qiu, B., Sasaki, H., Sun, Z., Zhang, X., Zhao, W. and Tian, J., 2020. Spatiotemporal characteristics and generation mechanisms of submesoscale currents in the

northeastern South China Sea revealed by numerical simulations. *Journal of Geophysical Research: Oceans*, 125(2), p.e2019JC015404.