



Urban areas rainier than surroundings from heat and smog.

Description

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Some cities receive more rain than their surroundings

Paul Brown / Alamy

Urban environments have a significant impact on weather patterns, causing numerous cities worldwide to experience a higher level of precipitation compared to their neighboring regions. This revelation could potentially reshape urban development strategies in the future.

According to Dev Niyogi from the University of Texas at Austin, "Just as urban areas exhibit an urban heat island effect, they also demonstrate an urban rainfall effect."

Niyogi and his team analyzed satellite data on rainfall from 2001 to 2020 in 1056 cities and their proximate rural areas across various climatic zones. Their research unveiled that more than 60% of these cities were termed "wet islands," receiving more rainfall than their surroundings, while some cities displayed the opposite phenomenon as "dry islands." For instance, cities like Ho Chi Minh City and Sydney were identified as the wettest anomalies, receiving over 100 millimeters more rainfall annually than their surroundings, whereas Seattle and Rio de Janeiro featured among the ten driest cities.

While previous studies have recognized the impact of individual cities on rainfall patterns, Niyogi asserts that this study is the first to present a global pattern of such influence. He emphasizes the necessity of viewing rainfall and urban areas as interconnected entities.

Cities can augment or diminish precipitation through various mechanisms. Factors such as heat absorption by urban infrastructure, building height, air pollution, and surface coverage all play a role in altering weather dynamics over urban regions. The study indicated that larger and more densely populated cities were more likely to exhibit wet island characteristics, with cities in temperate, tropical, and coastal zones exhibiting the most significant anomalies.

The investigation also noted a consistent increase in the average difference in rainfall between wet islands and surrounding areas over the studied period. This escalation, from an average of 37 to 62 millimeters more rainfall per year, can be attributed to rapid urbanization and escalating temperatures due to climate change, which elevate atmospheric water vapor levels.

Although current weather and climate models do not explicitly incorporate the influence of cities on rainfall, Niyogi anticipates the potential integration of such data into urban planning strategies in the future. This could involve tailored approaches for managing floods in wet cities and enhancing precipitation in drier urban areas.

Vocabulary List:

1. **Precipitation** /prɪˈsɪpɪˈteɪʃən/ (noun): Any form of water liquid or solid that falls from the atmosphere and reaches the ground.
2. **Augment** /ˈɔːɡmɪnt/ (verb): To make something greater by adding to it; increase.
3. **Urbanization** /ˌʊrbəˈnaɪzəʃən/ (noun): The process of making an area more urban or city-like.



4. **Anomalies** /ˈnɒm?li?z/ (noun): Deviations from the common rule; irregularities or exceptions.
5. **Interconnected** /ˈɪnt?r?k?n?kt?d/ (adjective): Mutually joined or related; connected with one another.
6. **Mechanisms** /ˈm?k?n?z?mz/ (noun): Structures or processes that underlie an operation or concept.

Comprehension Questions

Multiple Choice

1. What impact do urban environments have on weather patterns?
Option: Decrease precipitation levels in neighboring regions
Option: No significant impact on weather patterns
Option: Increase precipitation levels in neighboring regions
Option: Decrease overall rainfall
2. What term did Niyogi use to describe cities that receive more rainfall than their surroundings?
Option: Dry islands
Option: Moderate cities
Option: Wet islands
Option: Arid municipalities
3. According to the text, which cities were identified as wettest anomalies in terms of receiving more rainfall?
Option: Seattle and Rio de Janeiro
Option: Ho Chi Minh City and Sydney
Option: Tokyo and London
Option: Moscow and Mumbai
4. What factors can impact the augmentation or diminishment of precipitation in urban areas?
Option: Heat absorption by urban infrastructure and building height
Option: Deforestation in rural areas
Option: Mountainous topography
Option: Decrease in air pollution
5. Which type of cities are more likely to exhibit wet island characteristics, according to the study?
Option: Smaller and less populated cities
Option: Cities in arid zones
Option: Larger and more densely populated cities
Option: Isolated rural towns
6. What factor contributes to the increase in average difference in rainfall between wet islands and surrounding areas over the studied period?



- Option: Decrease in urbanization
- Option: Rising sea levels
- Option: Air pollution reduction
- Option: Rapid urbanization and escalating temperatures due to climate change

Answer

Multiple Choice: 1. Increase precipitation levels in neighboring regions 2. Wet islands 3. Ho Chi Minh City and Sydney 4. Heat absorption by urban infrastructure and building height 5. Larger and more densely populated cities 6. Rapid urbanization and escalating temperatures due to climate change

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. What term is used to describe the outer limit of knowledge or achievement in a particular area?
 - Option: A) Boundary
 - Option: B) Challenge
 - Option: C) Frontier
 - Option: D) Venture
2. What does the word "peril" generally mean?
 - Option: A) Safety
 - Option: B) Comfort
 - Option: C) Threat
 - Option: D) Joy
3. Which of the following best defines the term "designation"?
 - Option: A) Removal
 - Option: B) Appointment
 - Option: C) Rejection
 - Option: D) Isolation
4. What are "anomalies" in a system or process?
 - Option: A) Errors
 - Option: B) Improvements
 - Option: C) Regularities
 - Option: D) Anomalies
5. What term refers to the ability to be maintained at a certain rate or level?
 - Option: A) Growth
 - Option: B) Sustainability



- Option: C) Depletion
Option: D) Expansion

6. What does "collaboration" entail in a working environment?

- Option: A) Competition
Option: B) Isolation
Option: C) Cooperation
Option: D) Disturbance

7. Which term describes the process of increasing the population density in urban areas?

- Option: A) Ruralization
Option: B) Urbanization
Option: C) Migration
Option: D) Suburbanization

8. What does "augmentation" usually involve?

- Option: A) Reduction
Option: B) Growth
Option: C) Maintenance
Option: D) Stability

9. What is typically associated with the term "opposition"?

- Option: A) Support
Option: B) Agreement
Option: C) Resistance
Option: D) Authorization

10. What relates to the organic processes or functions in living organisms?

- Option: A) Biological
Option: B) Chemical
Option: C) Physical
Option: D) Physiological

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. The project needs to be assessed for its _____ before proceeding with further investments.

12. The factory will be expanded to increase its production _____.

13. The authorities _____ the illegal drugs hidden in the container.

14. Access to the sensitive information was blocked for _____ users.



15. The recent policy changes have led to a _____ in customer satisfaction.
16. The dangers of the job are _____ and cannot be eliminated completely.
17. The lost data was of critical importance and its _____ poses a significant challenge.
18. The forecast predicts heavy _____ in the region over the next few days.
19. The repeated delays caused a sense of _____ among the passengers waiting for their flight.
20. The new software includes improved security _____ to prevent unauthorized access.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

21. Astronauts often perform activities outside their spacecraft during missions.
22. Understanding the historical of events is crucial for accurate analysis.
23. Adequate is essential for the smooth functioning of any modern society.
24. Constructive can help individuals and organizations improve their performance.
25. Law enforcement agencies are working to apprehend the of the crime.
26. The global economy is made up of markets and industries.
27. The team their capabilities by leveraging new technologies.
28. The risks associated with the project are in its nature.
29. The concept was still and required further clarification.
30. Customs officials the smuggled goods at the border.

Answer

Multiple Choice: 1. C) Frontier 2. C) Threat 3. B) Appointment 4. A) Errors 5. B) Sustainability 6. C) Cooperation 7. B) Urbanization 8. B) Growth 9. C) Resistance 10. D) Physiological

Gap-Fill: 11. viability 12. capacity 13. seized 14. unauthorized 15. diminution 16. inherent 17. irretrievability 18. precipitation 19. frustration 20. mechanisms

Matching sentence: 1. Extravehicular 2. Significance 3. Infrastructure 4. Criticism 5. Perpetrators 6. Interconnected 7. Augmented 8. Inherent 9. Nebulous 10. Seized



CATEGORY

1. Sci/Tech - LEVEL6

Date Created

2024/09/10

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