

## Answers to Queries 1 and 2 in analyzed webpages

**Query 1:** What are the changes or inconsistencies in terms, phrases, or paragraphs among the mementos of webpage X?

**Query 2:** Compare any change regarding the semantic context among the mementos for the webpage X.

### 1. (WP1) URI-R: <http://srnl.doe.gov/> [2 mementos]

*Answer to Query 1:* The archived versions of the webpage [srnl.doe.gov/](http://srnl.doe.gov/) show several changes and inconsistencies over time:

#### 1. News and Updates:

- In the 2016 version, there is a mention of a partnership with Clemson to improve the electric grid, dated 01/14/2016, along with other news items from 2015 [3].

- The 2020 version highlights SRNL seeking partners for the DOE Visiting Faculty Program, dated 11/26/2019, and mentions advancements in mercury speciation sampling technology, dated 10/03/2019 [2].

#### 2. Video Releases:

- The 2016 version lists video releases related to SRNL's laboratory-directed research and development, interns and postdocs, and a series titled "Why SRS Matters" [3].

- The 2020 version mentions video releases about mercury speciation sampling technology [2].

#### 3. Events and Programs:

- The 2016 version includes an event about a DOE-EM robotics team meeting in December 2015 [3].

- The 2020 version does not mention specific events but focuses on seeking partners for a faculty program [2].

#### 4. Contact Information and Legal Notices:

- Both versions provide contact information for SRNL, including the operator's phone number and address, and mention that the website is maintained by SRNS Corporate Communications [2][3].

- Legal information and disclaimers are consistently present in both versions.

Overall, the changes reflect updates in news, video content, and program focus over the years, with a shift from specific events and partnerships in 2016 to broader program initiatives in 2020.

*Answer to Query 2:* The semantic context of the webpage [srnl.doe.gov/](http://srnl.doe.gov/) has shifted between the 2016 and 2020 versions. In 2016, the focus was on specific partnerships and events, such as the collaboration with Clemson to improve the electric grid and the DOE-EM robotics team meeting [3]. This indicates a focus on specific projects and collaborations at that time.

By 2020, the semantic context had shifted towards broader program initiatives, such as seeking partners for the DOE Visiting Faculty Program and advancements in mercury speciation sampling technology [2]. This reflects a move from highlighting specific events and partnerships to emphasizing ongoing research and development initiatives and broader programmatic goals.

Overall, the changes in semantic context suggest a transition from a focus on individual projects and events to a broader emphasis on research advancements and strategic partnerships.

### 2. (WP2) URI-R: <https://www.directives.doe.gov/> [2 mementos]

*Answer Query 1:* The archived versions of the webpage [www.directives.doe.gov/](https://www.directives.doe.gov/) show several changes and inconsistencies over time:

#### 1. Content Structure and Terminology:

- In the 2016 version [2], the webpage includes sections such as "current documents," "archived documents," "entire site," "search site only in current section," and "advanced search." It also mentions "directives," "delegations," "other requirements," and "resources."

- By 2020 [3], the structure has changed to include "status," "entire site," "current," "archived," "organization," and "all standards." The terms "guidance" and "invoked standards" are introduced, replacing "other requirements."

#### 2. News and Updates:

- In 2016 [2], the news section lists updates like "DOE N 251.114, cancellation of DOE directive" and other specific directives with dates in early 2016.

- In 2020 [3], the news section is updated with more recent directives such as "DOE O 227.1A Chg 1 (Adminchg), Independent Oversight Program" from January 2020.

#### 3. Purpose and Mission Statements:

- The 2016 version [2] includes a detailed mission statement about the Department of Energy's goals related to security, prosperity, and addressing energy challenges.

- The 2020 version [3] focuses more on the role of directives in setting policies and responsibilities, with less emphasis on the broader mission statement.

#### 4. Additional Features:

- The 2020 version [3] introduces new features like the "Technical Standards Portal" and "NNSA Directives Portal," which were not mentioned in the 2016 version.

These changes reflect a shift in focus and structure of the webpage over the four-year period, with updates to content, terminology, and additional features to enhance user navigation and information access.

**Answer Query 2:** The semantic context of the webpage [www.directives.doe.gov/](http://www.directives.doe.gov/) has evolved over time, reflecting changes in focus and structure:

#### 1. Content Structure and Terminology:

- In 2016, the webpage emphasized sections like "current documents," "archived documents," and "other requirements," which suggests a focus on categorizing and accessing various types of documents and requirements.

- By 2020, the terminology shifted to include "guidance" and "invoked standards," indicating a possible change in how directives are categorized or prioritized. This change in terminology may reflect a shift in the semantic context towards a more structured or standardized approach to directives.

#### 2. News and Updates:

- The 2016 version included specific updates about the cancellation of directives, which implies a focus on keeping users informed about changes in policy or document status.

- In 2020, the updates included more recent directives, suggesting an ongoing effort to keep the content current and relevant, which maintains the semantic context of providing timely and relevant information to users.

#### 3. Purpose and Mission Statements:

- The 2016 version had a detailed mission statement about the Department of Energy's broader goals, which provided a comprehensive context for the directives.

- By 2020, the focus shifted more towards the role of directives in setting policies and responsibilities, which narrows the semantic context to the specific function of directives within the department.

#### 4. Additional Features:

- The introduction of features like the "Technical Standards Portal" and "NNSA Directives Portal" in 2020 suggests an expansion of resources available to users, enhancing the semantic context by providing more tools for accessing and understanding directives.

Overall, the semantic context of the webpage has shifted from a broader focus on the Department of Energy's goals and document categorization to a more structured and standardized approach to directives, with an emphasis on providing current and relevant information and resources to users.

### 3. (WP3) URI-R: <http://www.netl.doe.gov/> [3 mementos]

**Answer Query 1:** The analysis of the archived versions of the webpage [www.netl.doe.gov/](http://www.netl.doe.gov/) reveals several changes and inconsistencies in terms, phrases, or paragraphs:

1. Content Additions and Modifications:

- In the version captured on 2020-06-30, there is a mention of "rare earth elements & critical minerals" which was not present in the earlier version from 2020-01-01. The earlier version only mentioned "rare earth elements" [2][3].
- The term "advanced coal processing" appears in the 2020-06-30 version, replacing "coal beneficiation" from the 2020-01-01 version [2][3].
- The 2020-06-30 version includes "energy storage" as a new category under research and programs, which was not listed in the 2020-01-01 version [2][3].

2. Semantic Context Changes:

- The 2020-06-30 version introduces a special notice regarding temporary flexibilities and relaxed requirements for recipients of NETL grants and cooperative agreements due to COVID-19, which is absent in the 2020-01-01 version. This reflects a response to the pandemic situation [3].
- The 2020-06-30 version includes additional news stories and announcements, such as the intent to provide \$122 million to establish coal products innovation centers, which are not present in the earlier version [3].

3. Corrections and Updates:

- The term "sucess stories" in the 2020-01-01 version is corrected to "success stories" in the 2020-06-30 version [2][3].

These changes indicate updates in the research focus, administrative responses to external events (like COVID-19), and corrections in the content over time.

**Answer Query 2:** The analysis of the archived versions of the webpage [www.netl.doe.gov/](http://www.netl.doe.gov/) reveals a notable change in the semantic context between the versions captured on 2020-01-01 and 2020-06-30:

1. Response to COVID-19:

- The version from 2020-06-30 introduces a special notice regarding temporary flexibilities and relaxed requirements for recipients of NETL grants and cooperative agreements due to the COVID-19 pandemic. This notice reflects an administrative response to the pandemic situation, which is absent in the earlier version from 2020-01-01. This change indicates an adaptation to external events affecting the organization's operations and stakeholders [3].

This change highlights how the organization adjusted its policies and communications in response to the global pandemic, reflecting a shift in priorities and operational considerations.

#### 4. (WP4) URI-R: <https://echo.epa.gov/> [2 mementos]

**Answer Query 1:** The analysis of the archived versions of the webpage [echo.epa.gov/](http://echo.epa.gov/) reveals the following changes and inconsistencies:

1. Content Updates:

- The "latest news" section in the 2016 version mentions specific news items such as the update of the EPA news RSS feed and a settlement regarding lead renovation violations [1]. In the 2020 version, the news section includes updates about recent EPA enforcement cases and settlements with specific companies [2]. This indicates a regular update of news content to reflect current events and enforcement actions.

2. Webinar and Training Information:

- The 2016 version includes information about upcoming webinars and training sessions, such as the "Introduction to ECHO" webinar scheduled for April 19, 2016 [3]. By 2020, the training section has expanded to include a series of webinars with recordings available for past sessions, such as the "Intro to ECHO" webinar held on June 23, 2020 [4]. This shows an enhancement in the training resources and availability of recorded sessions for users.

3. Tools and Features:

- The 2016 version lists various tools like advanced searches, developer tools, and map services [1]. In the 2020 version, additional tools and features are highlighted, such as the ECHO Exporter and access to web services for custom applications [5]. This suggests an expansion of the tools available to users for data analysis and compliance tracking.

#### 4. Help and Resources:

- Both versions provide access to help and resources, but the 2020 version includes more detailed guidance, such as video tutorials and a quick start guide [5]. This indicates an effort to improve user support and ease of navigation on the website.

Overall, the changes reflect updates in news content, enhancements in training and resources, and the addition of new tools and features to support users in compliance and enforcement tracking.

**Answer Query 2:** The semantic context of the webpage [echo.epa.gov/](http://echo.epa.gov/) has evolved over time, reflecting changes in focus and enhancements in the resources provided to users. Here are some key changes:

1. **Training and Webinars:** The semantic context has shifted from providing basic training and introductory webinars in 2016 to offering a more comprehensive series of webinars by 2020. The 2016 version focused on introducing users to the basics of the ECHO website and the acts it covers, such as the Clean Air Act and Clean Water Act [1]. By 2020, the training resources had expanded to include advanced webinars on specific topics like water and air facility searches, as well as recordings of past sessions [2]. This indicates a shift towards a more detailed and user-friendly approach to training.

2. **Tools and Features:** In 2016, the website highlighted basic tools like advanced searches and map services [1]. By 2020, the semantic context had expanded to include more sophisticated tools such as the ECHO Exporter and web services for custom applications [2]. This change reflects an enhancement in the analytical capabilities offered to users, allowing for more in-depth data analysis and compliance tracking.

3. **User Support and Resources:** The semantic context in 2016 provided basic help and resources, while by 2020, there was a noticeable improvement in user support with the addition of video tutorials, a quick start guide, and more detailed guidance [2]. This change suggests an increased emphasis on making the website more accessible and easier to navigate for users.

Overall, the semantic context of the webpage has evolved from providing basic introductory information to offering a more comprehensive and user-friendly experience with enhanced training, tools, and support resources.

#### 5. (WP5) URI-R: <http://www.epa.gov/careers> [2 mementos]

**Answer Query 1:** The analysis of the archived versions of the webpage [www.epa.gov/careers](http://www.epa.gov/careers) reveals several changes and inconsistencies over time:

##### 1. Content Additions and Removals:

- In the 2016 version, there is a mention of "Spotlight on EPA's Jacob Moss 2015 Samuel J. Heyman Service to America Medalist" and details about his work with clean cookstoves [5]. This content is not present in the 2020 version [1].

- The 2016 version includes a section on "criminal enforcement" with references to special agents and a YouTube channel [5], which is absent in the 2020 version [1].

##### 2. Changes in Career Opportunities:

- The 2020 version emphasizes opportunities for veterans, legal internships, and fellowships, and highlights the Office of Environmental Information (OEI) Innovation Fellowship Program [1]. These specific opportunities are not mentioned in the 2016 version [5].

##### 3. Semantic Context and Focus:

- The 2016 version has a broader focus on various career opportunities, including science careers, legal careers, and internships for law students [5].

- The 2020 version places a stronger emphasis on the EPA's mission and the importance of research and innovation, particularly in IT and digital services [1].

##### 4. Structural Changes:

- The 2016 version includes a "secondary menu" with language options and links to social media [5], which is not explicitly mentioned in the 2020 version [1].

These changes reflect a shift in focus and priorities over time, with the 2020 version highlighting specific programs and opportunities that align with the EPA's evolving mission and goals.

**Answer Query 2:** The semantic context of the webpage [www.epa.gov/careers](http://www.epa.gov/careers) has evolved between the 2016 and 2020 versions, reflecting shifts in focus and priorities:

1. 2016 Version:

- The 2016 version presents a broad overview of career opportunities at the EPA, including science careers, legal careers, and internships for law students. It highlights individual achievements, such as Jacob Moss's work on clean cookstoves, and emphasizes criminal enforcement with references to special agents and a YouTube channel. This suggests a focus on diverse career paths and enforcement activities [5].

2. 2020 Version:

- By 2020, the semantic context shifts towards emphasizing the EPA's mission and the importance of research and innovation, particularly in IT and digital services. The webpage highlights opportunities for veterans, legal internships, and fellowships, and introduces the Office of Environmental Information (OEI) Innovation Fellowship Program. This version focuses more on the agency's mission to protect human health and the environment, encouraging individuals to contribute to this mission through various roles at the EPA [1].

Overall, the semantic context has transitioned from a broad overview of career opportunities and individual achievements to a more focused narrative on innovation, digital services, and specific programs that align with the EPA's evolving mission.

## 6. (WP6) URI-R: <https://echo.epa.gov/help/training> [2 mementos]

**Answer Query 1:** The archived versions of the webpage "[echo.epa.gov/help/training](https://echo.epa.gov/help/training)" show several changes and updates over time:

1. Webinar Information and Content:

- In the 2016 version, the webpage mentions a series of webinars, including "Introduction to ECHO" and "Intro to the Acts in ECHO," with specific dates and times for these events [1]. By 2020, the content has expanded to include more detailed descriptions of various webinars, such as "Intro to ECHO," "Advanced ECHO Webinar: Behind the Scenes," and "Advanced ECHO Webinar: Water" [3]. These later versions provide more comprehensive information about the webinars, including the topics covered, the format (e.g., PDF presentations, MP4 recordings), and the requirement for registration before accessing the recordings.

2. Focus and Structure of Webinars:

- The 2016 version focuses on introducing the ECHO website and its basic functionalities, with webinars aimed at providing a foundational understanding of the acts and tools available on the site [1]. By 2020, the webinars have evolved to include more advanced topics and detailed demonstrations, such as accessing and using water tools and reports, and exploring air facility search capabilities [3].

3. Additional Resources and Tools:

- The 2016 version lists various resources and tools available on the ECHO website, such as facility search help, enforcement case search help, and dashboards help [1]. In the 2020 version, there is a more structured presentation of resources, including video tutorials, quick start guides, and detailed help sections for different types of reports and dashboards [3].

4. Registration and Access Requirements:

- In the 2016 version, there is a mention of a registration step required for downloading webinar recordings, with a note that the EPA plans to replace this with a non-registration option in the future [1]. By 2020, the registration requirement is still present for accessing webinar recordings, indicating that this aspect has not changed [3].

Overall, the changes reflect an expansion and enhancement of the training resources and webinars offered by the ECHO website, with a shift towards more detailed and advanced content over time.

**Answer Query 2:** The semantic context of the webpage "[echo.epa.gov/help/training](https://echo.epa.gov/help/training)" has evolved over time, reflecting changes in focus and the depth of content offered:

1. Expansion of Webinar Topics: Initially, the focus was on introducing the ECHO website and its basic functionalities, with webinars aimed at providing a foundational understanding of the acts and tools available on the site [1]. By 2020, the webinars had expanded to include more advanced topics and detailed demonstrations, such as accessing and using water tools and reports, and exploring air facility search capabilities [3]. This shift indicates a move towards providing more comprehensive and specialized training resources.

2. *Increased Detail and Structure:* Over time, the content became more structured and detailed. The 2016 version provided basic information about webinars and resources [1], while the 2020 version offered more comprehensive descriptions, including the topics covered, formats available (e.g., PDF presentations, MP4 recordings), and registration requirements [3]. This change suggests an effort to enhance user understanding and accessibility of the training materials.

3. *Focus on Advanced Analysis:* The later versions of the webpage emphasize advanced analysis capabilities, such as using ECHO tools for detailed environmental data interpretation and compliance tracking [3]. This reflects a shift in semantic context from basic introductions to enabling users to perform more complex analyses and gain deeper insights into environmental data.

Overall, the semantic context has shifted from providing introductory content to offering more advanced and detailed training resources, reflecting an evolution in the scope and depth of the educational materials provided by the ECHO website.

## 7. (WP7) URI-R: <https://www.epa.gov/climate-change-water-sector> [4 mementos]

**Answer Query 1:** The archived versions of the webpage "www.epa.gov/climate-change-water-sector" show several changes and inconsistencies over time:

### 1. Content Additions and Removals:

- The 2016 versions (both January and June) include a "Climate Change and Water Newsletter" section, which is absent in the 2020 version. This section provided information on recent editions and sign-up options for the newsletter [2][3].

- The 2016 versions also mention a "Calendar of Climate Change and Water Events," which includes upcoming conferences, training, and webcasts. This is not present in the 2020 version [2][3].

- The 2020 version introduces the "ARC-X (EPA Climate Change Adaptation Resource Center)" under the "What's New" section, which is not mentioned in the 2016 versions [1].

### 2. Changes in Featured Tools and Programs:

- The 2016 versions list "Understanding Climate Change Impacts on Water Resources: Watershed Academy Online Training Module" as a featured tool, which is not mentioned in the 2020 version [2][3].

- The 2020 version includes "Resilience and Adaptation in New England (RAINE)" as a featured tool, which is not present in the 2016 versions [1].

### 3. Semantic Context and Structural Changes:

- The 2020 version has a more structured main menu with specific categories like "Environmental Topics," "Laws & Regulations," and "About EPA," which are not explicitly structured in the 2016 versions [1].

- The 2016 versions have a secondary menu with language options (e.g., Español, 中文, Tiếng Việt, 한국어), which is not visible in the 2020 version [2][3].

### 4. Updates and Maintenance:

- The "Last updated" date is different across versions, with the 2016 version last updated on December 3, 2015, and the 2020 version last updated on May 7, 2019 [1][3].

These changes reflect updates in content focus, available resources, and structural organization of the webpage over time.

**Answer Query 2:** The semantic context of the webpage "www.epa.gov/climate-change-water-sector" has undergone several changes across different archived versions:

### 1. Main Menu Structure:

- The 2016 versions have a less structured main menu, with categories like "Learn the Issues," "Laws & Regulations," and "About EPA" not explicitly organized [2][3].

- The 2020 version presents a more structured main menu with specific categories such as "Environmental Topics," "Laws & Regulations," and "About EPA," indicating a shift towards a more organized presentation of information [1].

### 2. Secondary Menu and Language Options:

- The 2016 versions include a secondary menu with language options (e.g., *Español*, *中文*, *Tiếng Việt*, *한국어*), which is not visible in the 2020 version. This change suggests a shift in how language accessibility is presented or prioritized [2][3].

### 3. Focus on New Tools and Resources:

- The 2020 version introduces new tools and resources, such as the "ARC-X (EPA Climate Change Adaptation Resource Center)" and "Resilience and Adaptation in New England (RAINE)," which are not mentioned in the 2016 versions. This reflects a change in focus towards new adaptation resources and tools [1].

### 4. Removal of Certain Sections:

- The 2016 versions include sections like the "Climate Change and Water Newsletter" and "Calendar of Climate Change and Water Events," which are absent in the 2020 version. This indicates a shift away from these specific informational resources [2][3].

These changes in the semantic context reflect updates in the organization, focus, and presentation of information on the webpage over time.

## 8. (WP8) URI-R: <http://www3.epa.gov/enviro/> [2 mementos]

**Answer Query 1:** The mementos of the webpage [www3.epa.gov/enviro/](http://www3.epa.gov/enviro/) show the following changes and inconsistencies:

### 1. Content Additions and Removals:

- The 2020 version includes additional elements such as "gov white house ask. contact us hotlines foia requests frequent questions follow." This content is not present in the earlier versions.

- The 2020 version also lists social media platforms like "facebook twitter youtube flickr instagram," which are not mentioned in the earlier versions.

### 2. Update Information:

- The 2020 version includes a placeholder for the last updated date, "{ month day, yyyy }," indicating that the specific date was not captured or displayed at the time of archiving.

These changes suggest an expansion in the content related to contact options and social media presence in the 2020 version compared to earlier versions. Additionally, the placeholder for the update date indicates a possible issue with displaying dynamic content at the time of archiving.

**Answer Query 2:** The mementos of the webpage [www3.epa.gov/enviro/](http://www3.epa.gov/enviro/) show the following changes in semantic context:

1. Content Expansion: The 2020 version includes additional elements such as "gov white house ask. contact us hotlines foia requests frequent questions follow." This suggests an expansion in the content related to contact options and social media presence compared to earlier versions.

2. Social Media Presence: The 2020 version lists social media platforms like "facebook twitter youtube flickr instagram," which indicates an increased emphasis on social media engagement.

3. Dynamic Content Placeholder: The 2020 version includes a placeholder for the last updated date, "{ month day, yyyy }," indicating a possible issue with displaying dynamic content at the time of archiving.

These changes reflect a shift towards providing more comprehensive contact information and enhancing social media connectivity, which may indicate a broader strategy to improve public engagement and accessibility.

## 9. (WP9) URI-R: <http://www3.epa.gov/hudson/> [2 mementos]

**Answer Query 1:** The archived versions of the webpage [www3.epa.gov/hudson/](http://www3.epa.gov/hudson/) show several changes and inconsistencies over time:

### 1. Content Updates and Additions:



- The 2016 version includes information about the agreement with General Electric to further investigate the upper Hudson River floodplain, along with various fact sheets and technical documents related to the Hudson River PCBs Superfund Site [4].
- By 2020, the content has been updated to include new actions on the upper Hudson River PCB cleanup, such as the second five-year review and certification of completion of remedial action. It also includes updates on the Hudson River floodplain and fish advisories [3].

## 2. Document and Media References:

- The 2016 version references multimedia content like a podcast on archaeology at Superfund sites and a video about returning a river to health [4].
- The 2020 version includes references to audio recordings of press briefings and updated reports on the Hudson River PCBs Superfund Site [3].

## 3. Language and Navigation:

- Both versions provide navigation options and language support, including Spanish, Chinese, Vietnamese, and Korean. However, the specific layout and presentation of these options may have changed slightly between versions [4][3].

## 4. Technical and Cleanup Information:

- The 2016 version provides detailed technical requirements and performance standards for Phase 2 of the cleanup, as well as information on Phase 1 dredging [4].
- The 2020 version continues to provide technical documents but focuses more on recent updates and actions taken regarding the cleanup process [3].

Overall, the changes reflect ongoing updates to the cleanup efforts and communication of new findings and actions related to the Hudson River PCBs Superfund Site.

**Answer Query 2:** The semantic context of the webpage [www3.epa.gov/hudson/](http://www3.epa.gov/hudson/) has evolved between the archived versions from 2016 and 2020. Here are the key changes:

1. **Focus on Completion and Updates:** The 2020 version emphasizes the completion of remedial actions and provides updates on the Hudson River floodplain, including fact sheets and community updates from 2019 and 2018 [2]. This indicates a shift towards reporting on the progress and completion of ongoing projects.
2. **Introduction of New Information:** The 2020 version includes new sections such as "Hudson River floodplain: summer 2019 update" and "Hudson River fish advisories," which were not present in the 2016 version. This suggests an increased focus on public health advisories and recent developments in the project [2].
3. **Removal of Older Content:** The 2016 version contains information about the sixth season of Hudson River dredging and agreements with General Electric to investigate the floodplain, which are not present in the 2020 version [3]. This indicates a transition from ongoing project activities to reporting on completed actions and outcomes.

Overall, the semantic context has shifted from detailing ongoing activities and agreements to highlighting completed actions, updates, and public health advisories related to the Hudson River cleanup efforts.

# 10. (WP10) URI-R: <http://www3.epa.gov/ttn/atw/> [2 mementos]

**Answer Query 1:** The changes or inconsistencies among the mementos of the webpage [www3.epa.gov/ttn/atw/](http://www3.epa.gov/ttn/atw/) are as follows:

1. **Terminology Change:** In the 2016 version, the term "National - Scale Air Toxics Assessment" is used, whereas in the 2020 version, it is referred to as "National Air Toxics Assessment" [1][2]. This indicates a change in the naming or branding of the assessment program.
2. **Content Structure:** Both versions maintain a similar structure in terms of navigation and content categories, such as "Rules & Implementation," "Risk Studies," "Education & Outreach," and "Technical Resources." However, the specific phrasing of some sections has been updated, as noted in the terminology change above.

These are the primary changes identified between the two versions of the webpage.

**Answer Query 2:** The semantic context of the webpage [www3.epa.gov/ttn/atw/](http://www3.epa.gov/ttn/atw/) has undergone a change between the archived versions from 2016 and 2020. In the 2016 version, the section "rules & implementation" is referred to as "national - scale air toxics assessment"



[3]. By 2020, this section is referred to as "national air toxics assessment" [2]. This change in terminology from "national - scale" to "national" suggests a possible shift in focus or scope, potentially indicating a broader or more inclusive approach to air toxics assessment. However, without additional context, the exact implications of this change in terminology are not fully clear.

## 11. URI-R: <https://www3.epa.gov/ttn/chief/comments.html> [2 mementos]

**Answer Query 1:** There is insufficient information provided in the context to identify changes regarding the semantic context among the mementos of the webpage [www3.epa.gov/ttn/chief/comments.html](https://www3.epa.gov/ttn/chief/comments.html). The excerpts provided do not include content from this specific webpage, so no analysis can be conducted.

**Answer Query 2:** There is insufficient information provided in the context to identify changes regarding the semantic context among the mementos of the webpage [www3.epa.gov/ttn/chief/comments.html](https://www3.epa.gov/ttn/chief/comments.html). The excerpts provided do not include content from this specific webpage, so no analysis can be conducted.

## 12. (WP11) URI-R: <https://www3.epa.gov/ttn/chief/net/index.html> [2 mementos]

**Answer Query 1:** The archived versions of the webpage [www3.epa.gov/ttn/chief/net/index.html](https://www3.epa.gov/ttn/chief/net/index.html) show the following changes:

1. Content Relocation and Redesign: The 2016-08-13 version of the webpage indicates that the "Air Emissions Inventories" section has been moved and redesigned. It provides a new URL (<https://www.epa.gov/air-emissions-inventories>) for accessing the updated content. This suggests a significant change in the structure and possibly the content of the webpage, as users are directed to update their bookmarks to the new location.

2. Navigation and Structure: The 2016 version includes a navigation structure with options like "chief home," "air emissions inventories," "air emissions modeling," and "emission factors." This indicates a structured approach to presenting information related to air emissions inventories, which might have been altered or expanded in the redesign mentioned.

These changes reflect a shift in how the EPA presents and organizes information related to air emissions inventories, likely aiming for improved accessibility and updated content.

**Answer Query 2:** The archived versions of the webpage [www3.epa.gov/ttn/chief/net/index.html](https://www3.epa.gov/ttn/chief/net/index.html) from 2016-08-13 and 2020-10-19 show no changes in the semantic context. Both versions indicate that the "Air Emissions Inventories" section has been redesigned and moved to a new URL (<https://www.epa.gov/air-emissions-inventories>). The content in both versions is identical, suggesting that there have been no updates or changes in the semantic context between these two captures.

## 13. (WP12) URI-R: <https://airbornescience.nasa.gov/> [2 mementos]

**Answer Query 1:** The archived versions of the webpage [airbornescience.nasa.gov/](https://airbornescience.nasa.gov/) show several changes and inconsistencies over time:

1. Content Structure and Terminology:

- In the 2016 version, the webpage includes sections such as "Program Current Activities," "Student Airborne Research Program," "ASP Blog," and "Research Opportunities" [1]. By 2020, the structure has shifted to include "Airborne Missions," "NASA Earth Expeditions Blog," and "ASP Sensor Network" [4]. This indicates a reorganization and possible expansion of the program's focus areas.

2. Document Listings:

- The 2016 version lists documents like the "Fall - 2016 Newsletter" and "FY16 ASP Call Letter - Rev1" [1]. In contrast, the 2020 version updates these to "Fall 2019 - Newsletter" and "2020 - Call Letter" [4], reflecting the passage of time and the release of new documents.

3. News and Updates:

- The news section in 2016 mentions specific missions and studies such as the "NASA Global Hawk to begin NOAA El Nino Storm Mission" and "Methane Emissions in Arctic Cold Season Higher than Expected" [1]. By 2020, the news has shifted to topics like "NASA to Study East Coast Snowstorms from VA. Skies" [4], indicating a change in the focus of NASA's airborne science missions.

4. Technical and Support Information:

- The 2016 version includes detailed technical support sections like "Instrument TRL Levels" and "Engineering Support" [1]. In 2020, there is an addition of "ASP Sensor Network" and "Mishap Preparedness and Contingency Plan" [4], suggesting an enhancement in technical capabilities and safety protocols.

#### 5. Semantic Context:

- The semantic context of the webpage evolves from a focus on specific research activities and technical support in 2016 to a broader emphasis on missions and network capabilities by 2020. This shift may reflect changes in NASA's strategic priorities or advancements in airborne science technology.

These changes highlight the dynamic nature of NASA's Airborne Science Program, with updates in content reflecting new missions, updated documentation, and expanded technical capabilities.

**Answer Query 2:** The archived versions of the webpage [airbornescience.nasa.gov/](https://airbornescience.nasa.gov/) from 2016 and 2020 show several changes in content and semantic context:

#### 1. Content Additions and Updates:

- The 2020 version includes more detailed sections on various NASA research centers and programs, such as the NASA Earth Expeditions Blog and the Student Airborne Research Program, which were not as prominently detailed in the 2016 version. This indicates an expansion in the scope of information provided about NASA's airborne science activities.

- The 2020 version also includes new sections like "Mission Tools" and "Science Reports," which provide more comprehensive resources and tools for users interested in NASA's airborne missions.

#### 2. Semantic Context Changes:

- The 2016 version focuses more on the current activities and specific missions like the Olympic Mountain Experiment and the North Atlantic Aerosols and Marine Ecosystems Study. It emphasizes ongoing research and the involvement of students and young scientists.

- By 2020, the semantic context shifts slightly to include more structured information about the program's logistics, such as aircraft schedules, mission maps, and detailed flight requests. This suggests a move towards providing more operational and logistical details to support research activities.

#### 3. Emphasis on Research Opportunities:

- Both versions highlight research opportunities, but the 2020 version provides more structured information on how to engage with these opportunities, such as creating new accounts and logging into the Airborne Science platform. This reflects an increased focus on user engagement and accessibility.

Overall, the changes from 2016 to 2020 reflect a broadening of the information available on the site, with a greater emphasis on operational details and user engagement, while maintaining a strong focus on research and educational opportunities.

## 14. (WP13) URI-R: <https://data.giss.nasa.gov/gistemp/> [2 mementos]

**Answer Query 1:** The archived versions of the webpage [data.giss.nasa.gov/gistemp/](https://data.giss.nasa.gov/gistemp/) show several changes and updates over time. Here are the key differences identified:

#### 1. Leadership and Contributors:

- In the 2016 version, the research was previously led by Dr. James E. Hansen, with Dr. Reto Ruedy, Dr. Makiko Sato, and Dr. Ken Lo participating in the GISTEMP analysis [2].

- By 2020, the leadership had shifted to Dr. Gavin Schmidt, with additional contributors such as Avi Persin and Michael Hendrickson mentioned [1].

#### 2. Data Sources and Versions:

- The 2016 version mentions the use of NOAA GHCN v3 for meteorological stations and ERSST v4 for ocean areas [2].

- The 2020 version updates this to NOAA GHCN v4 and ERSST v5, indicating a transition to newer datasets [1].

### 3. Updates and News:

- The 2016 version refers to updates being made around the middle of every month using current data files [2].
- The 2020 version provides more detailed news and updates, including specific dates and changes, such as the discontinuation of GHCN v3 updates and the introduction of GISTEMP v4 [1].

### 4. Citation and Publications:

- The 2016 version cites a 2010 publication by Hansen et al. for the methodology [2].
- The 2020 version includes a more recent publication by Lenssen et al. (2019) for improvements in the GISTEMP uncertainty model [1].

### 5. Methodology and Analysis:

- The 2016 version describes the use of adjusted GHCN v3 data and mentions the urban and peri-urban station adjustments [2].
- The 2020 version elaborates on the use of satellite-observed night lights for station classification and mentions the use of adjusted GHCN v4 data [1].

These changes reflect updates in leadership, data sources, methodologies, and the inclusion of more recent research and publications over the years.

**Answer Query 2:** Between the archived versions of the webpage [data.giss.nasa.gov/gistemp/](https://data.giss.nasa.gov/gistemp/) from 2016 and 2020, several changes in content and semantic context can be identified:

1. **Version Update:** The 2016 version refers to the GISTEMP analysis using GHCN v3 and ERSST v4 data [1]. By 2020, the analysis had been updated to GISTEMP v4, using GHCN v4 and ERSST v5 data [2]. This indicates a progression in the data sources and methodologies used for the analysis.

2. **Research Leadership:** In 2016, the research was led by Dr. Reto Ruedy, with participation from Dr. Makiko Sato and Dr. Ken Lo, and was previously led by Dr. James E. Hansen [1]. By 2020, Dr. Gavin Schmidt is noted as the current leader of the research, with additional researchers like Avi Persin and Michael Hendrickson participating [3].

3. **Data and Methodology Changes:** The 2020 version mentions that NOAA/NCEI no longer maintains GHCN v3, and updates to GISTEMP v3 concluded with the July 2019 update. The analysis now uses adjusted GHCN v4 data, and some graphics provide an uncertainty domain for estimates [2]. This reflects an evolution in the data processing and presentation methods.

4. **Citation and Publications:** The 2016 version cites a 2010 publication by Hansen et al. [1], while the 2020 version includes a more recent 2019 publication by Lenssen et al. [3]. This change highlights ongoing research and updates in the field.

5. **Additional Features and Tools:** The 2020 version includes more detailed information about the availability of programs and tools for data analysis, such as Python-based programs for Unix-like systems, and mentions the availability of gridded temperature anomaly data in various formats [4]. This suggests an expansion in the resources provided to users for data analysis.

Overall, the changes between the 2016 and 2020 versions reflect updates in data sources, leadership, research publications, and the tools available for data analysis, indicating ongoing development and refinement of the GISTEMP analysis.

## 15. URI-R: <https://earthdata.nasa.gov/user-resources/remote-sensors> [3 mementos]

**Answer Query 1:** The context provided does not include multiple mementos or versions of the webpage "earthdata.nasa.gov/user-resources/remote-sensors" to compare. Therefore, there is insufficient information to identify changes or inconsistencies in terms, phrases, or paragraphs among the mementos of this specific webpage.

**Answer Query 2:** The archived versions of the webpage <https://earthdata.nasa.gov/user-resources/remote-sensors> show several changes in content and semantic context over time:

### 1. Content Changes:

- The 2016-03-12 version [1] includes detailed descriptions of various climate observation instruments and their purposes, such as the Climate Absolute Radiance and Refractivity Observatory (CLARREO) and the Cyclone Global Navigation Satellite System (CYGNSS). It focuses on providing accurate climate records and understanding climate change impacts.

- The 2016-04-16 version [2] expands on the description of instruments and their roles in climate modeling and observation. It includes additional details on the distribution of aerosols and their impact on climate forces, as well as the study of ocean surface wind speed in tropical cyclones.

- The 2019-05-01 version [3] introduces new instruments and missions, such as the Coral Reef Airborne Laboratory (CORAL), which aims to survey coral reefs using advanced instruments. This version emphasizes the creation of a unique database for coral reef conditions.

## 2. Semantic Context Changes:

- The earlier versions (2016) focus heavily on the technical aspects of climate observation instruments and their roles in climate modeling and data accuracy. The emphasis is on understanding and mitigating climate change through detailed data collection and analysis.

- By 2019, the semantic context shifts slightly to include broader environmental monitoring, such as the health of coral reefs, indicating an expansion of focus from purely atmospheric and climate data to include ecological systems and their responses to environmental changes.

Overall, the changes reflect an evolution from a focus on atmospheric and climate data collection to a broader environmental monitoring approach, incorporating ecological studies alongside traditional climate science.

## 16. (WP14) URI-R: <https://eosweb.larc.nasa.gov/> [2 mementos]

**Answer Query 1:** The mementos of the webpage [eosweb.larc.nasa.gov/](https://eosweb.larc.nasa.gov/) show several changes and inconsistencies over time:

### 1. Content Changes:

- In the 2016 version, the webpage includes a section on "tropospheric chemistry" with a description of measurements of chemical constituents in the atmosphere, including major greenhouse gases like CO<sub>2</sub>, CH<sub>4</sub>, and CFCs [6]. By 2020, this section is referred to as "tropospheric composition," which may indicate a shift in focus or terminology [5].

- The 2020 version introduces a new publication announcement related to the MISR Level 2 aerosol product and the Level 3 component [5]. This content is not present in the 2016 version.

### 2. Semantic Context Changes:

- The 2016 version emphasizes "tropospheric chemistry" as a science discipline, while the 2020 version uses "tropospheric composition," suggesting a possible broadening or redefinition of the scope of study [6][5].

- The 2020 version provides more detailed information about the Atmospheric Science Data Center (ASDC) and its responsibilities, including processing, archival, and distribution of NASA Earth science data, which is not as explicitly detailed in the 2016 version [5].

These changes reflect updates in terminology, focus areas, and additional content related to ongoing projects and publications.

**Answer Query 2:** The semantic context of the webpage [eosweb.larc.nasa.gov/](https://eosweb.larc.nasa.gov/) has undergone several changes between the archived versions from 2016 and 2020.

1. **Content and Tools:** In the 2016 version, the webpage emphasizes the processing, archiving, and distribution of Earth science data at NASA Langley Research Center, with a focus on various data descriptions such as aerosols, clouds, radiation budget, and tropospheric chemistry [2]. The tools mentioned include the MISR order and customization tool, and the toolsets for airborne data (TAD) [2]. By 2020, the webpage continues to focus on similar data processing activities but introduces more specific tools and resources, such as the MISR Level 3 web data browser and various search and subset tools for different datasets like CALIPSO and CERES [6].

2. **Project and Data Center Information:** The 2016 version provides a general overview of the Atmospheric Science Data Center (ASDC) and its role in supporting over 50 projects and providing access to more than 800 archived data sets [2]. The 2020 version expands on this by detailing the ASDC's responsibilities and its integration into NASA's Earth Observing System Data and Information System (EOSDIS) [6].

3. **Updates and Announcements:** The 2020 version includes updates about new publications and announcements related to the MISR Level 2 aerosol product and Level 3 component [6]. This indicates a shift towards providing more current information and updates directly on the webpage.

Overall, the semantic context has evolved from a broad description of data processing and tools to a more detailed and updated presentation of available resources, tools, and recent developments in Earth science data management.

## 17. (WP15) URI-R: <https://esto.nasa.gov/> [2 mementos]

**Answer Query 1:** The archived versions of the webpage [esto.nasa.gov/](https://esto.nasa.gov/) from 2016 and 2020 show several changes and inconsistencies in terms, phrases, and paragraphs:

### 1. Content Updates:

- The 2016 version mentions the "Grifex cubesat launched in January as an auxiliary payload to the NASA soil moisture active passive mission" and highlights the "first sustainable land imaging - technology solicitation" [4]. These specific events and solicitations are not mentioned in the 2020 version.
- The 2020 version introduces new content such as "tiny NASA satellite will soon see 'rainbows' in clouds" and mentions the "2019 solicitation for the sustainable land imaging - technology (SLI-T) program" [8]. These updates reflect ongoing and recent projects that were not present in the 2016 version.

### 2. News and Announcements:

- The 2016 version includes news about the "portable remote imaging spectrometer (PRISM)" and "GPS sensor web helps forecasters warn of monsoon flash floods" [4]. These specific news items are absent in the 2020 version.
- The 2020 version provides updates on recent developments such as "CIRIS launches successfully" and the "airborne lunar spectral irradiance instrument (AIR-LUSI)" [8].

### 3. Semantic Context:

- The semantic context has shifted from focusing on past activities and solicitations in 2016 to highlighting recent technological advancements and ongoing projects in 2020. This reflects a natural progression in the content to keep it current and relevant.

Overall, the changes between the 2016 and 2020 versions of the [esto.nasa.gov/](https://esto.nasa.gov/) webpage primarily involve updates to reflect new projects, solicitations, and technological advancements, while older content and news have been replaced or removed.

**Answer Query 2:** The semantic context of the webpage [esto.nasa.gov/](https://esto.nasa.gov/) has evolved between the archived versions from 2016 and 2020. In 2016, the focus was on past activities and specific projects such as the "Grifex cubesat" launch and the "first sustainable land imaging - technology solicitation" [4]. The content highlighted the technological developments and solicitations relevant at that time, reflecting a focus on past achievements and ongoing solicitations.

By 2020, the semantic context shifted to emphasize recent technological advancements and ongoing projects. The webpage introduced new content such as the "tiny NASA satellite will soon see 'rainbows' in clouds" and updates on recent developments like "CIRIS launches successfully" [8]. This change indicates a progression towards highlighting current and future projects, reflecting the ongoing nature of NASA's Earth Science Technology Office's work.

Overall, the semantic context transitioned from a retrospective focus on past activities and solicitations to a forward-looking emphasis on recent technological advancements and ongoing projects.

## 18. (WP16) URI-R: <http://hyspiri.jpl.nasa.gov/> [2 mementos]

**Answer Query 1:** The archived versions of the webpage [hyspiri.jpl.nasa.gov/](http://hyspiri.jpl.nasa.gov/) show several changes and inconsistencies over time:

### 1. Content Updates:

- In the 2016 version, the webpage mentions the "6th annual HyspIRI production symposium and aquatic forum: June 1 - 3, 2016" and the "2015 HyspIRI science and applications workshop" [3]. This content is not present in the 2020 version.
- The 2020 version includes references to the "2018 HyspIRI final report" and the "2018 HyspIRI workshop agenda and presentations" [1]. These updates reflect the progression of the mission and its activities over the years.

### 2. Mission Description:

- The mission description remains consistent between the 2016 and 2020 versions, detailing the purpose of the HypsIRI mission, its instruments, and its objectives related to studying ecosystems and natural disasters [3][5].

### 3. Navigation and Structure:

- The navigation structure in the 2016 version includes sections like "Science Applied," "Science Study," and "Opportunities" [5]. In contrast, the 2020 version has sections like "NRC Decadal Survey" and "Gallery" [1]. This indicates a reorganization of the website's content and focus areas.

### 4. Instrument Details:

- The technical details about the instruments (VSWR and TIR) and their specifications remain unchanged between the two versions, indicating consistency in the mission's technical aspects [3][5].

Overall, the changes between the 2016 and 2020 versions of the webpage primarily reflect updates in the mission's activities and a reorganization of the website's content structure.

**Answer Query 2:** The archived versions of the webpage [hyspirci.jpl.nasa.gov/](http://hyspirci.jpl.nasa.gov/) from 2016 and 2020 show some changes in content and semantic context:

#### 1. Content Changes:

- The 2016 version mentions the "6th annual HypsIRI production symposium and aquatic forum: June 1 - 3, 2016" and the "2015 HypsIRI science and applications workshop" [3]. These specific events are not mentioned in the 2020 version.

- The 2020 version includes references to the "2018 HypsIRI final report" and the "2018 HypsIRI workshop agenda and presentations" [1]. These updates reflect more recent activities and reports related to the mission.

#### 2. Semantic Context Changes:

- The 2016 version emphasizes the mission's study stage and its role as a focal point for information on the mission activities [3]. This context remains consistent in the 2020 version, indicating that the mission is still in the study phase and the website continues to serve as an information hub [1].

- The 2020 version provides additional context by mentioning the "2017 Earth Science and Applications from Space (ESAS) Decadal Survey" [1], which was not present in the 2016 version. This inclusion suggests an ongoing alignment with broader NASA and scientific community priorities.

Overall, the changes reflect updates in the mission's activities and reports while maintaining the core purpose of the website as an information source for the HypsIRI mission.

## 19. (WP17) URI-R: <http://isccp.giss.nasa.gov/> [2 mementos]

**Answer Query 1:** The archived versions of the webpage [isccp.giss.nasa.gov/](http://isccp.giss.nasa.gov/) show several changes and inconsistencies over time:

1. **Maintenance and Data Processing:** In the 2020 version, it is noted that the website's content is no longer actively maintained and that ISCCP data processing is now performed at NOAA/NCEI. This information is not present in the 2016 version, indicating a shift in responsibility for data processing and a change in the maintenance status of the website [2].

2. **Content and Features:** The 2020 version includes a disclaimer about the potential for broken links or outdated information, which is absent in the 2016 version. This suggests a change in the website's operational status and possibly its relevance as a current resource [2].

3. **Personnel and Contact Information:** The 2016 version lists William B. Rossow as the ISCCP science contact and Violeta Golea as the technical contact and website curator. By 2020, the website curator is listed as Robert Schmunk, and the NASA official is George Tselioudis, indicating changes in personnel associated with the project [1][2].

4. **Events and Anniversaries:** The 2020 version mentions the Rossow Symposium 2017 and ISCCP anniversaries (30th and 25th), which are not mentioned in the 2016 version. This reflects updates to include significant events related to the ISCCP [2].

These changes highlight a transition in the website's role from an actively maintained resource to a more static, historical archive, along with updates in personnel and the inclusion of significant project milestones.

**Answer Query 2:** The semantic context of the webpage [isccp.giss.nasa.gov/](http://isccp.giss.nasa.gov/) has changed between the archived versions. In the earlier version captured on 2020-03-03, the content indicates that the website is no longer actively maintained and is kept online for historical purposes. It mentions that the ISCCP data processing is now performed at NOAA/NCEI, and directs users to visit the NOAA/NCEI website for access to ISCCP H data products and other up-to-date information. This suggests a shift in the responsibility for data processing and a redirection of users to a different source for current data and information. The content also includes historical references to the ISCCP project and its anniversaries, indicating a focus on the legacy and historical significance of the project [3].

## 20. (WP18) URI-R: <http://modis.gsfc.nasa.gov/data/dataproduct/index.php> [2 mementos]

**Answer Query 1:** The mementos of the webpage [modis.gsfc.nasa.gov/data/dataproduct/index.php](http://modis.gsfc.nasa.gov/data/dataproduct/index.php) show the following changes and inconsistencies:

1. Sub-surface Chlorophyll-a Concentration: In the 2016-01-21 version, there is a mention of "sub-surface chlorophyll-a concentration" under ocean products, which is not present in the 2020-04-03 version. This indicates a removal or alteration of this specific data product in the later version.
2. Fluorescence Line Height (FLH): In the 2016-01-21 version, it is referred to as "fluorescence line height (FLH)," whereas in the 2020-04-03 version, it is referred to as "normalized fluorescence line height (FLH)." This change suggests a modification in the terminology or the method of calculation for this product.
3. Order of Content: The order and presentation of the data products and categories appear consistent between the two versions, with no significant reordering or restructuring observed.

These changes reflect updates or modifications in the data products offered or the terminology used on the webpage over time.

**Answer Query 2:** The mementos of the webpage [modis.gsfc.nasa.gov/data/dataproduct/index.php](http://modis.gsfc.nasa.gov/data/dataproduct/index.php) captured on 2016-01-21 and 2020-04-03 show some changes in the semantic context:

### 1. Content Additions and Modifications:

- In the 2020 version, there is an addition of "normalized fluorescence line height (flh)" under ocean products, which was not present in the 2016 version. This indicates an expansion in the types of data products available for oceanographic studies.
- The 2020 version includes "particulate organic carbon" and "particulate inorganic carbon" under ocean products, which were not explicitly listed in the 2016 version. This suggests a more detailed categorization of ocean products in the later version.

### 2. Terminology Changes:

- The term "sub-surface chlorophyll-a concentration" in the 2016 version is changed to "chlorophyll-a concentration" in the 2020 version. This change might reflect a broader or more generalized approach to the data product description.

### 3. Structural Changes:

- The structure of the list of products remains largely the same, but there are slight rewordings and reordering of items, which may reflect updates in the categorization or prioritization of data products.

Overall, the changes between the two versions indicate an enhancement and expansion of the data products offered, particularly in the ocean products category, reflecting ongoing developments and refinements in the MODIS data offerings.

## 21. (WP19) URI-R: <https://www.climate.gov/enso> [4 mementos]

**Answer Query 1:** The mementos of the webpage [www.climate.gov/enso](https://www.climate.gov/enso) show the following changes and inconsistencies:

1. Content Addition: In the version captured on 2020-12-31, there is an additional section about a trip to Antarctica and its relation to ENSO, featuring an image of emperor penguins at Gould Bay, Antarctica, dated December 3, 2013. This content is not present in the version captured on 2020-06-30 [1][3].
2. Consistent Sections: Both versions maintain consistent sections on featured resources and articles, including popular El Niño and La Niña images, FAQs, U.S. risk of seasonal extremes during ENSO, educational resources, and quarterly outlooks by region. The regions listed are also consistent across both versions [1][3].



3. *Global Resources and NOAA Sections:* The sections listing global resources and NOAA-related ENSO resources remain unchanged between the two versions. These include links to various international and NOAA resources related to ENSO [1][3].

4. *General Website Information:* Both versions include general website information such as contact details, FAQs, site map, and privacy policy, with no noted changes in these sections [1][3].

Overall, the primary change between the two mementos is the addition of the Antarctica-related content in the later version.

**Answer query 2:** The semantic context of the webpage [www.climate.gov/enso](http://www.climate.gov/enso) has remained largely consistent across the different mementos. The primary focus of the page is on El Niño and La Niña phenomena, providing resources and articles related to these climate events. Both versions captured in 2020 (on June 30 and December 31) include sections on frequently asked questions, U.S. risk of seasonal extremes during ENSO, educational resources, and global resources related to ENSO. They also mention various organizations involved in ENSO research and monitoring, such as the Australian Bureau of Meteorology and the World Meteorological Organization.

The main change observed is the addition of a specific feature in the December 31, 2020, version, which includes a reference to a trip to Antarctica and its relation to ENSO, illustrated with an image of emperor penguins. This addition provides a more engaging narrative element to the page, potentially broadening the context to include the impact of ENSO on different regions, such as Antarctica.

Overall, while the core content and focus on ENSO remain the same, the December 31, 2020, version introduces a new narrative element that slightly broadens the semantic context by highlighting ENSO's impact on Antarctica.

## 22. URI-R: <https://coast.noaa.gov/about/> [2 mementos]

**Answer Query 1:** The context provided does not include any specific excerpts from the webpage "[coast.noaa.gov/about/](https://coast.noaa.gov/about/)" that would allow for a comparison of changes or inconsistencies in terms, phrases, or paragraphs among different mementos. Therefore, there is insufficient information to identify any changes or inconsistencies for that specific webpage.

**Answer Query 2:** The context provided does not include multiple mementos of the webpage "[coast.noaa.gov/about/](https://coast.noaa.gov/about/)" to compare changes in the semantic context. There is only one excerpt from this webpage captured on 2016-05-28. Therefore, there is insufficient information to identify any changes in the semantic context for this specific webpage.

## 23. (WP20) URI-R: <https://dods.ndbc.noaa.gov/> [2 mementos]

**Answer Query 1:** The mementos of the webpage [dods.ndbc.noaa.gov/](https://dods.ndbc.noaa.gov/) show several changes and inconsistencies in terms, phrases, or paragraphs between the versions captured on 2020-02-27 and 2016-03-03:

### 1. Navigation and Content Structure:

- The 2020 version includes navigation options like "home," "about us," "contact us," and "search," while the 2016 version lists "home," "news," and "organization" [1][2].

- The 2020 version mentions "station id search," "station list," "data access," and "mobile access," whereas the 2016 version includes "observations," "mobile access," and "obs via google maps" [1][2].

### 2. Data and Observations:

- The 2020 version lists "recent dart® obs," "search ship obs report," and "buoycams," while the 2016 version includes "recent historical dart®," "oil & gas adcp obs," and "gliders" [1][2].

### 3. Program Information:

- The 2020 version mentions "program info," "tao," "dart®," "ioos®," and "publications," whereas the 2016 version includes "about ndbc," "met / ocean moored buoy," "c - man," "tao," "dart®," "vos," "csp," and "ioos® program" [1][2].

### 4. Data Access and Protocols:

- Both versions describe the Distributed Oceanographic Data Systems (DODS) and the use of the Open-source Project for a Network Data Access Protocol (OPeNDAP), but the 2020 version emphasizes the use of Thematic Real-time Environmental Distributed Data Services (THREDDS) and the Network Common Data Form (NetCDF) [1][2].

### 5. File Naming and Data Processing:

- The file naming convention and data processing details are consistent between the two versions, with both mentioning the use of NetCDF files and the process for handling "real-time" and historical data [1][2].

Overall, the changes reflect updates in navigation, data types, and program information, with a consistent approach to data access and processing.

**Answer Query 2:** The semantic context of the webpage "dods.ndbc.noaa.gov" has undergone some changes between the archived versions from 2016 and 2020.

#### 1. Content Structure and Terminology:

- In the 2016 version, the webpage includes sections such as "news," "organization," "observations," and "email access" [2]. By 2020, these sections have been replaced or rephrased, with terms like "about us," "contact us," and "web data guide" appearing instead [1]. This indicates a shift in focus from organizational and observational aspects to more user-centric and data access-oriented content.

#### 2. Data Access and Protocols:

- Both versions discuss the Distributed Oceanographic Data Systems (DODS) and the use of the Open-source Project for a Network Data Access Protocol (OPeNDAP) [1][2]. However, the 2020 version emphasizes the implementation of DODS using Thematic Real-time Environmental Distributed Data Services (THREDDS) and the adherence to NetCDF CF metadata conventions [1]. This suggests an increased emphasis on data standardization and accessibility.

#### 3. Data Organization:

- The 2016 version mentions "recent historical" and "oil & gas" data types, which are not explicitly mentioned in the 2020 version [2]. Instead, the 2020 version provides a detailed explanation of the file naming convention and the organization of data by type and station [1]. This change reflects a more structured approach to data categorization and retrieval.

#### 4. User Interaction:

- The 2020 version includes features like "web widget" and "mobile access," indicating a focus on enhancing user interaction and accessibility through modern web tools [1]. These features are not mentioned in the 2016 version, suggesting an evolution towards a more interactive and user-friendly interface.

Overall, the semantic context has shifted from a broader organizational and observational focus to a more detailed, user-centric, and data-driven approach, with an emphasis on accessibility and standardization.

## 24. (WP21) URI-R: <http://www.nodc.noaa.gov/> [3 mementos]

**Note:** In query 2, sources [2][6] correspond to URI 25 (the next one with same domain). In query 3, sources [2][5] also correspond to URI 25.

**Answer Query 1:** The mementos of the webpage [www.nodc.noaa.gov/](http://www.nodc.noaa.gov/) show several changes and inconsistencies over time:

1. **Data Submission Process:** In the 2016 version, the webpage provides detailed guidance and assistance for investigators submitting data to NODC, including the role of a liaison officer and the use of the Ocean Archive System for accessing archived data [6]. By 2020, the process has been updated to include two options for data archive based on delivery frequency and volume, with specific tools like Send2NCEI and ATRAC mentioned for data submission [2].

2. **Contact Information and Social Media:** Both versions provide contact information and encourage following on social media platforms like Facebook and Twitter. However, the 2020 version includes a more structured format for these details, with explicit mentions of privacy policy, disclaimer, and FOIA [2][4].

3. **Last Modified Date:** The 2016 version of the webpage includes a "last modified" date of October 18, 2013 [6], while the 2020 version does not specify a last modified date in the provided excerpt [2].

These changes reflect updates in the data submission process and a more organized presentation of contact and policy information over time.

**Answer Query 2:** The provided context includes excerpts from different archived versions of the webpage [www.nodc.noaa.gov/](http://www.nodc.noaa.gov/). Here is an analysis of the changes in semantic context across these versions:

### *1. Data Submission Guidelines:*

*- In the 2016 version, the focus is on providing guidance and assistance to investigators for submitting data to NODC, with an emphasis on the role of the NODC liaison officer in assisting with data submission formats and requirements [5].*

*- By 2020, the content has evolved to provide more detailed instructions on how to submit data to NCEI, including specific options for data archive based on delivery frequency and volume. The introduction of tools like Send2NCEI and ATRAC for data submission is highlighted, indicating a shift towards more structured and tool-based data submission processes [2].*

### *2. Contact Information and Social Media:*

*- Both versions maintain contact information and encourage interaction through social media platforms like Facebook and Twitter. However, the 2020 version includes a more structured approach to data submission and archival processes, reflecting an organizational shift towards digital tools and resources [2][5].*

### *3. Privacy and Policy Statements:*

*- The privacy policy, disclaimer, and information quality statements remain consistent across the versions, indicating a continued emphasis on transparency and adherence to federal guidelines [2][5].*

*Overall, the semantic context has shifted from a more general guidance approach in 2016 to a more detailed and tool-oriented process in 2020, reflecting advancements in digital data management and submission practices.*

## 25. (W22) URI-R: <http://www.nodc.noaa.gov/submit/submit-guide.html> [2 mementos]

**Answer Query 1:** *The archived versions of the webpage [www.nodc.noaa.gov/submit/submit-guide.html](http://www.nodc.noaa.gov/submit/submit-guide.html) show several changes and inconsistencies over time:*

### *1. Data Submission Process:*

*- In the 2016 version, the webpage mentions the involvement of a "NODC liaison officer" who assists investigators with data submission formats and requirements [2]. This role is not mentioned in the 2020 version.*

*- The 2020 version introduces specific tools for data submission based on data size and frequency: "send2ncei" for data less than 20 GB and "ATRAC" for larger or multiple deliveries [1]. These tools are not mentioned in the 2016 version.*

### *2. Data Documentation and Metadata:*

*- The 2016 version provides detailed guidelines on data documentation, including metadata requirements such as descriptions of parameters, collection methods, and geographic information [3]. This level of detail is not present in the 2020 version.*

### *3. Contact Information:*

*- The 2020 version provides an email address for inquiries about the archival process: "nodc.dataofficer@noaa.gov" [1]. This specific contact information is not present in the 2016 version.*

### *4. Policy and Guidelines:*

*- The 2016 version discusses the federal ocean data policy and the responsibilities of funding agencies and national centers in data submission and management [3]. This policy context is not explicitly mentioned in the 2020 version.*

### *5. Last Modified Date:*

*- The 2016 version indicates a last modified date of "Friday, 18-Oct-2013" [2], while the 2020 version shows "Saturday, 14-Apr-2018" [1], indicating updates to the content between these dates.*

*Overall, the changes reflect a shift towards more structured and tool-based data submission processes in the 2020 version, along with some removal of detailed policy and documentation guidelines present in the 2016 version.*

**Answer Query 2:** *The archived versions of the webpage [www.nodc.noaa.gov/submit/submit-guide.html](http://www.nodc.noaa.gov/submit/submit-guide.html) show several changes in both content and semantic context over time.*

1. *Organizational Changes:* The earlier versions refer to the National Oceanographic Data Center (NODC) [2][3], while the later version refers to the National Centers for Environmental Information (NCEI) [1]. This indicates a reorganization or renaming of the agency responsible for data submission and archiving.
2. *Data Submission Process:* In the 2016 version, the process involves contacting a NODC data officer or liaison office to initiate data submission [3]. By 2020, the process has been updated to include specific tools like "send2ncei" and "ATRAC" for data submission, depending on the data size and frequency [1]. This reflects a shift towards more automated and tool-based data submission processes.
3. *Data Documentation Requirements:* The 2016 version emphasizes the need for detailed documentation, including metadata and references to literature, to ensure data quality and usability [3]. The 2020 version continues this emphasis but also highlights the use of specific formats like ISO 19115 for metadata and encourages the use of machine-interoperable data formats like netCDF or HDF [1]. This change suggests an increased focus on standardization and interoperability in data documentation.
4. *Assistance and Support:* In 2016, the NODC liaison officer provides guidance and assistance to investigators [2]. By 2020, this role is taken over by NCEI science stewards, who assist with data submission and ensure data quality [1]. This change reflects a possible shift in the roles and responsibilities within the organization.
5. *Data Types and Policies:* The 2020 version includes a broader range of data types and emphasizes the importance of meeting federal open data initiatives [1]. This reflects a broader scope of data collection and a commitment to open data policies compared to the 2016 version.

Overall, the changes indicate a shift towards more structured, standardized, and automated processes for data submission and documentation, as well as a broader organizational scope and commitment to open data initiatives.

## 26. URI-R: <http://www.nssl.noaa.gov/projects/telex/> [2 mementos]

**Answer Query 1:** There is insufficient information in the provided context to identify changes or inconsistencies in terms, phrases, or paragraphs among the mementos of the webpage [www.nssl.noaa.gov/projects/telex/](http://www.nssl.noaa.gov/projects/telex/). The context does not include any excerpts or details from this specific webpage.

**Answer Query 2:** There is insufficient information in the provided context to identify changes regarding the semantic context among the mementos of the webpage [www.nssl.noaa.gov/projects/telex/](http://www.nssl.noaa.gov/projects/telex/). The excerpts provided do not include content from this specific URL, so no comparison or analysis can be made.

## 27. (WP23) URI-R: <http://www.nssl.noaa.gov/siteinfo.php> [2 mementos]

**Answer Query 1:** The analysis of the archived versions of the webpage [www.nssl.noaa.gov/siteinfo.php](http://www.nssl.noaa.gov/siteinfo.php) reveals the following changes and inconsistencies:

### 1. Privacy Policy and Data Collection:

- In the 2016 version, the privacy policy mentions the use of Google Analytics and the DigitalGov.gov search engine for gathering information about visitors, which does not identify them personally. This information is used to improve the site ([2]).
- The 2020 version retains this information but adds more context about the use of personally identifiable information, stating that it is only used to respond to messages and provide requested information and services ([1]).

### 2. Public Interaction and Comment Policy:

- Both versions discuss the policy on public comments, stating that comments will not be edited but may be removed if they contain unacceptable content. The reasons for removal, such as abusive or off-topic comments, are consistent across both versions ([2], [1]).

### 3. Supporting Applications:

- The 2016 version includes a section on supporting applications, listing Adobe Acrobat Reader and Google Earth as necessary for viewing certain file types ([2]).
- This section is also present in the 2020 version, indicating no change in this aspect ([1]).

### 4. Plain Language and Accessibility:

- The 2020 version includes a section on the commitment to using plain language, referencing the Plain Writing Act of 2010 and inviting feedback from users to improve clarity ([1]).

- This section is not present in the 2016 version, indicating it was added later.

#### 5. Content on Research and External Links:

- The 2020 version provides additional information on the scope of NSSL's research, explicitly stating areas not covered by NSSL, such as hurricanes and space weather, and directing users to other resources for these topics ([1]).

- This detailed guidance is not present in the 2016 version, suggesting an expansion in the content to better inform users.

Overall, the changes between the 2016 and 2020 versions reflect an expansion in content, particularly in providing more detailed information about the scope of research and the use of plain language, while maintaining consistency in privacy and comment policies.

**Answer Query 2:** The archived versions of the webpage [www.nssl.noaa.gov/siteinfo.php](http://www.nssl.noaa.gov/siteinfo.php) from 2016 and 2020 show several changes in both content and semantic context:

1. Privacy Policy and Comment Moderation: In the 2016 version, the privacy policy mentions the use of Google Analytics and DigitalGov.gov for web analytics and search engine purposes, and it states that personally identifiable information is not collected unless voluntarily provided by the user. The 2020 version retains this information but adds a more detailed comment moderation policy. It specifies that while the NSSL does not discriminate against views or opinions, it reserves the right to remove comments that are abusive, vulgar, obscene, racist, threatening, or harassing, among other criteria. This addition reflects a more structured approach to handling public interaction on their platforms [1][2].

2. Plain Language Commitment: The 2020 version introduces a new section on the commitment to using plain language, in compliance with the Plain Writing Act of 2010. This section emphasizes the importance of clear communication with the public and invites feedback to improve the clarity of their documents and web pages. This addition indicates a shift towards more user-friendly communication [2].

3. Scope of Research and External Links: The 2020 version includes a new section titled "Can't find it here?" which clarifies the scope of NSSL's research and provides links to other NOAA and government resources for topics outside their focus, such as hurricanes and earthquakes. This addition helps users navigate to the appropriate resources for their specific interests, enhancing the semantic context by clearly defining the laboratory's research boundaries [2].

4. Supporting Applications and Credits: Both versions mention the need for additional software to view certain file types, such as Adobe Acrobat Reader for PDFs and Google Earth for KMZ files. However, the 2020 version includes a more detailed explanation of the licensing for photos and icons used on the site, indicating a greater emphasis on transparency and proper attribution [1][2].

Overall, the changes between the 2016 and 2020 versions reflect an increased focus on user engagement, clarity in communication, and transparency in content usage and moderation policies.

## 28. URI-R: <https://www.nssl.noaa.gov/education/svrwx101/> [2 mementos]

**Answer Query 1:** The context provided does not include any excerpts from the webpage [www.nssl.noaa.gov/education/svrwx101/](http://www.nssl.noaa.gov/education/svrwx101/). Therefore, there is insufficient information to identify changes or inconsistencies in terms, phrases, or paragraphs among the mementos of that specific webpage.

**Answer Query 2:** The context provided does not include any excerpts or specific information from the webpage [www.nssl.noaa.gov/education/svrwx101/](http://www.nssl.noaa.gov/education/svrwx101/). Therefore, there is insufficient information to identify or compare changes regarding the semantic context among the mementos of that specific webpage.

## 29. (WP24) URI-R: <https://www.nssl.noaa.gov/research/tornadoes/> [2 mementos]

**Answer Query 1:** The analysis of the mementos of the webpage [www.nssl.noaa.gov/research/tornadoes/](http://www.nssl.noaa.gov/research/tornadoes/) reveals the following changes and inconsistencies:

#### 1. Content Additions and Modifications:

- In the 2020-06-16 version, there is a detailed description of the "tornado warning decision support" system, which includes the development of an automated multi-radar, multi-sensor (MRMS) system. This content is not present in the 2016-06-18 version.

- The 2020-06-16 version also includes information about the "warn-on-forecast" project, which aims to create detailed forecast models for earlier tornado warnings. This specific project description is not found in the 2016-06-18 version.

## 2. Semantic Context Changes:

- The 2020-06-16 version emphasizes the collaboration between NSSL and the NOAA National Weather Service to improve operational radars and streamline research into practical operations. This collaborative aspect is not highlighted in the 2016-06-18 version.

- The 2020-06-16 version includes a section on "tornado preparedness," focusing on improving public preparedness for extreme weather, which is not mentioned in the 2016-06-18 version.

## 3. Historical Context and Projects:

- Both versions mention the identification of the tornado vortex signature pattern in Doppler radar data in 1973. However, the 2020-06-16 version provides additional context about the "Tornado Intercept Project" in 1975 and the role of NSSL's phased array radar in spotting developing tornadoes, which are not detailed in the 2016-06-18 version.

These changes indicate an expansion and update of the content over time, with a greater focus on current projects and collaborations in the later version.

**Answer Query 2:** The semantic context of the webpage [www.nssl.noaa.gov/research/tornadoes/](http://www.nssl.noaa.gov/research/tornadoes/) has remained largely consistent across the different mementos. The focus of the content is on tornado research, forecasting, and preparedness, with an emphasis on the National Severe Storms Laboratory's (NSSL) efforts to improve tornado warning systems and public safety.

1. Tornado Research and Projects: Both versions highlight the NSSL's involvement in significant tornado research projects, such as the VORTEX projects, which aim to understand tornado formation and improve forecasting. The mention of the "tornado vortex signature" discovery in 1973 is consistent across the versions, emphasizing its importance in the development of Doppler radar technology for tornado detection.

2. Warn-on-Forecast Project: The semantic context includes the Warn-on-Forecast project, which aims to create detailed forecast models to issue earlier tornado warnings. This project is mentioned in both versions, indicating its ongoing significance in NSSL's research efforts.

3. Public Preparedness and Safety: Both versions discuss the goal of shaping a "weather ready nation" to enhance public preparedness for extreme weather events. This includes improving communication of threats and increasing community resilience.

Overall, while there may be minor differences in wording or additional details in specific sections, the core semantic context related to tornado research, forecasting, and public safety remains consistent across the archived versions.

## 30. URI-R: <http://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp> [2 mementos]

**Answer Query 1:** There is insufficient information provided in the context to identify changes or inconsistencies in terms, phrases, or paragraphs among the mementos of the webpage [www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp](http://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp). The context does not include any excerpts or details from this specific webpage.

**Answer Query 2:** There is insufficient information provided in the context to identify changes regarding the semantic context among the mementos of the webpage [www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp](http://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp). The excerpts provided do not include content from this specific webpage, so no comparison or analysis can be made.