




Shipwrecks on Roncador Cay, the Caribbean Sea and Their Relationship with Hurricanes, 1492–1920

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Abstract

Previous studies suggest that tropical storms and hurricanes are among the leading causes of shipwrecks in the Caribbean Sea since 1492. This paper will explore the relationship between shipwrecks and hurricanes in the Western Caribbean, particularly Roncador Cay, a place with complex environmental conditions that have made this area a trap for ships, but has up until now, been without rigorous shipwreck analysis. This study covers the period 1492 to 1920 with search results of 23 shipwrecks and 37 tropical cyclones compiled in databases, reviewing seven wrecks already documented and revealing new information on 16, previously not recorded. The sources provide detailed shipwrecks, demonstrating that most accidents occurred by unspecific causes and no direct relationship with hurricanes but were influenced by environmental conditions, such as geomorphology, cold fronts, or currents. There is also a reflection on the sociocultural changes and the influence of power in the region. The study includes a suggested tool for future research, protecting the wreck site and emphasizing the importance of the underwater cultural heritage as an indicator of the active maritime past.

Keywords Shipwrecks · Hurricanes · Caribbean Sea · Roncador Cay · Underwater cultural heritage

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Introduction

Storm activities and hurricanes are among the leading causes of shipwrecks in the Caribbean Sea (Lugo-Fernández et al. 2007:38; Rappaport and Fernández-Partagás 1997:97-98; Trouet et al. 2016: 3173), a place holding a few of the most important Underwater Cultural Heritage (UCH) sites globally (Leshikar-Denton 2002:279). For centuries, cays, banks, and islands in the Western Caribbean have presented a risk for navigators (Herrera y Tordesillas 1601:12-36). The Archipelago of San Andres, Old Providence, and Santa Catalina (ASAPSC) is one of these places in the Caribbean Sea due to its strategic position and environmental conditions that have made this area a trap for ships (Gould 2011: 82-83; Throckmorton 1964: 51-61). A rigorous review of shipwrecks in the archipelago has not been undertaken because parts of the necessary information have either been lost or destroyed during the region's Independence Wars at the beginning of the nineteenth century (Thomas 1974: 346), some accidents were never documented, and pilots (navigation officer) and survivors did not recognize certain places. Also, during colonial times, news on shipwrecks was ambiguous with information disappearing between “Cartagena de Indias and Havana” without an exact revisions of the sites or reported as “lost at sea” (Lugo-Fernández et al. 2007:38), as the case of the galleon *Santiago* wrecked in 1658 (Fernández-Duro 1899: 437; Serrano 1991:36) or the four galleons of 1605 from the Armada de la Guarda de la Carrera de Indias (Spanish fleet) (Fernández-Duro 1897:253; Segovia 2007).

Located more than 77 nautical miles from Old Providence Island, Roncador Cay is part of the Archipelago. It was given its name by Spanish mariners because of the “snoring” sound produced by constant wave noise, warning of the dangers to navigation, as a deadly trap for ships (Jameson 2010 [1923]:8; Newton 1914:277). One of the first systematic studies on shipwrecks in the region were conducted by Marx (1987), and Romero and Perez (2005) focused primarily on the seventeenth and eighteenth centuries, with a few marine accidents registered in the Cay, but limited information.

This paper aims from quantitative and qualitative research, to explore the relationship between shipwrecks and hurricanes in Roncador Cay from the perspective of underwater cultural heritage, generating a database of shipwrecks and hurricanes (Bryman 2003). Information was collected from archives, databases, and several sources starting from 1492 when hurricanes and shipwrecks were first recorded in the Caribbean Sea (García-Herrera et al. 2007:55; Millas 1968: 300; Vizenor 1991:42) to 1920, considering all wrecks as UCH according to Article 2 of the Colombia Submerged Heritage Law, from 2013, which defined and explained the status of an underwater cultural heritage site and also set a 100-year limitation period for permanently submerged shipwrecks, in addition to other legal aspects provided by the law (Diario Oficial de Colombia 2013). Analysis of data collected on shipwreck events which were permitted as validation of ship loss circumstances, is connected to nautical charts for determining tropical cyclones as the leading cause of ships being wrecked in the Caribbean Sea before 1920 (Chenoweth 2006; García-Herrera et al. 2007; Millas 1968; NOAA 2020;

Poey 1855). The study will be based on three concepts: validation of shipwrecks with historical hurricanes affecting ASAPSC and nautical charts, non-existence of databases on Roncador Cay, and shipwrecks from different sources.

The research identified 23 shipwrecks with new information of sixteen unrecorded wrecks and reviewed seven others, previously documented by different authors and compiled data on 37 hurricanes reported in the archipelagic waters. Information was classified in databases, analyzing every shipwreck source and its relationships with hurricanes. One of the study's main goals is to unveil UCH's great potential in Colombia and to provide a shipwreck database that does not currently exist in the archipelago. It also suggests a tool for future underwater research recognizing and protecting wreck sites, highlighting past maritime activity, and recovering a forgotten part of maritime history.

Environmental Condition and historical background-Roncador Cay

The archipelago of San Andres, Old Providence, and Santa Catalina (ASAPSC), is located in the southwest of the Caribbean Sea with approximately 180,000 km², including the Sea Flower Biosphere Reserve, an extensive coral reef system declared a reserve by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2000 (Coralina-Invemar 2012; Mow et al. 2003). The archipelago is an impressive region due to its geography and dispersion of several cays, atolls, and islands of mainly coral and volcanic origin. It is mostly composed of the cays and banks of Roncador, Serrana, Serranilla, Quitasueño, Albuquerque, and Bajo Nuevo, and the largest inhabited islands, San Andres, Old Providence and Santa Catalina (Fig. 1) (Coralina-Invemar 2012; Dimar 2005).

Roncador Cay is 400 m long and 150 m wide with a bank of approximately 15 km long and seven km wide with a unique morphology (Geister and Díaz 2007; Idárraga-García and León 2019; Milliman 1969:13, 14; Nicaragua v. Colombia 2008: 26). The complexity of the region's climate is defined by its tropical location modulated by the Intertropical Convergence Zone (ITCZ) with two seasonal periods determined by precipitation (rainy season-August to November) and northeast trade winds with severe weather events as cold fronts (dry season-December to April). During the dry season, the northeast trade winds dominate the Caribbean Sea with an average speed of 15 knots and diurnal variation peaks up to 30 knots (Andrade and Barton 2000). Also, cold front events strongly impact the archipelago during the first three months of the year, increasing the intensity of the wind, cloud cover and wave height, with an annual average of six events in the area (Ortiz-Royero et al. 2013:2797-2801). The archipelago is highly vulnerable as it is located in the hurricane belt (Ortiz-Royero 2007, 2012:826). This area is impacted by surface currents in the northeast direction (Andrade 2001); however, Serrana Bank and Roncador Cay are influenced by strong currents in the northwest direction (Garay et al. 1988:3-4).

Navigated by Christopher Columbus during his fourth voyage from Jamaica to Honduras (Feiling 2018:7; Vergara y Velasco 1888:76), the archipelago is considered one of the most treacherous areas to sail in the Caribbean Sea (Hernández

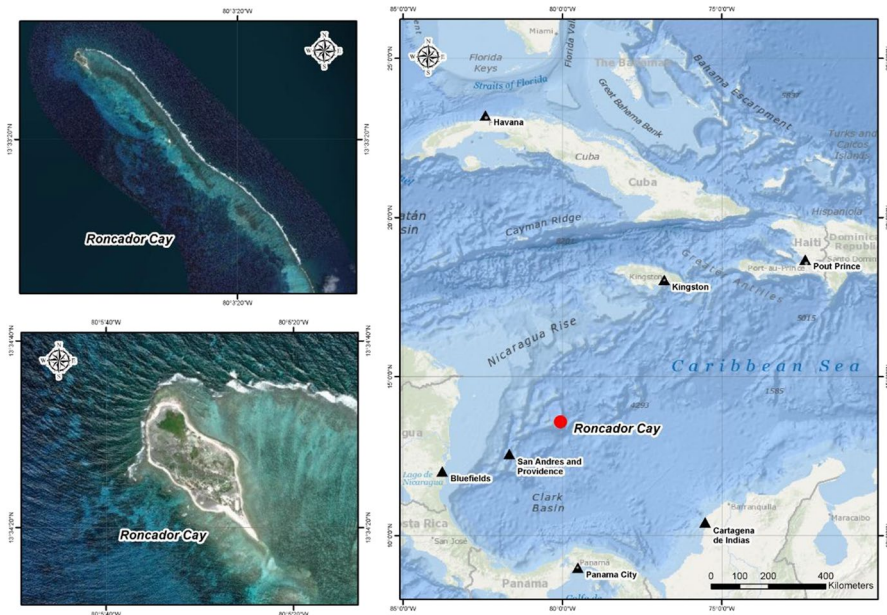


Fig. 1 Map of Roncador Cay and its location in the Caribbean Sea, in one of the main navigation routes, between Central America (Nicaragua and Panama Canal), South America (Colombia), and Jamaica

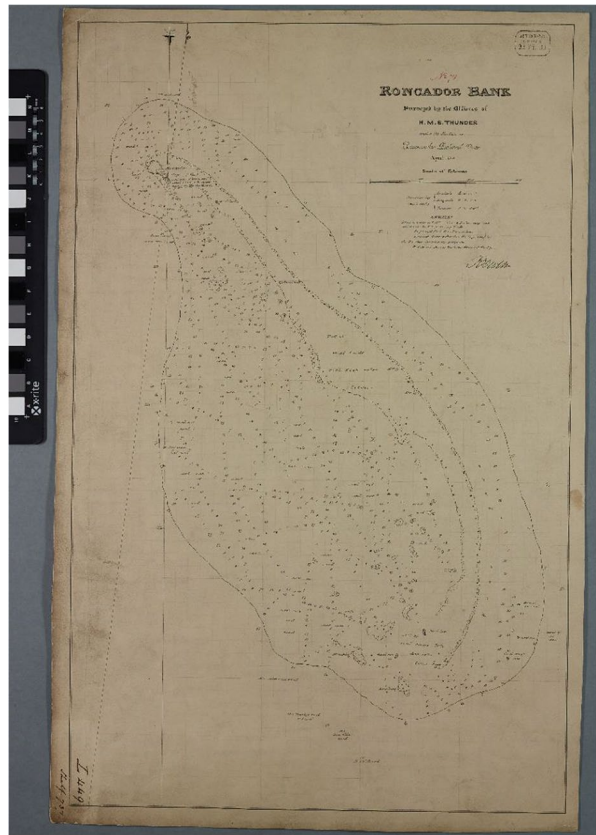
Oliva 2009: 94; Herrera y Tordesillas 1601:12-36). The complex environmental conditions are the main obstacle for navigators in the region due to its geomorphology with many islands, cays, banks (Gomez-Pretel and Jeong 2020:20; Parsons 1956:4), as well as severe weather events such as cold fronts and tropical cyclones. Also, strong currents may lead to a ship drifting off-course, especially between Roncador Cay and Serrana Bank (Ariza et al. 2018; Coralina-Invemar 2012:36-59; Richardson 2005).

There is no exact information about the discovery of Roncador, but Spanish navigators mentioned it in the early sixteen century with the name “Roncador” (US Department of State, Office of the Legal Advisor 1932) because of the noise made by the breaking wave (Jameson 2010/1923: 8; Newton 1914:277). The first map of the Caribbean made by Juan de la Cosa makes no mention of the archipelago, and it was recognized for the first time in 1529 by Diogo Ribeiro map (Sutton and Yingling 2020; Vigneras 1962). The dangers of sailing from Cartagena de Indias to Havana in the late sixteenth century were described by the cosmographer-chronicler Juan López De Velasco (1894), who highlighted the dangers between Roncador Cay (13° north) to Serranilla Bank (16° north). Also, Herrera y Tordesillas (1601) described this area, warning navigators about the risks and hazards. During the nineteenth century, Roncador was known as “the graveyard of the Caribbean” among American navigators and a dangerous area to sail and approach (Hobson 1894:164).

The Spanish surveyed Roncador Cay in 1804 (Domínguez et al. 2012), but HMS *Shearwater* questioned its position on the chart, determining eighteen” further eastward and some bathymetric measurements with low accuracy (Purdy 1825:54). After 1828, the British surveyed ASAPSC producing high-quality nautical charts (Figs. 2 and 3) (Allen 1841; Kupperman 1993:355; Gomez-Pretel and Jeong 2020:21).

The area became one of the leading maritime trade routes during colonial times connecting the South American continent with Cuba (Cartagena de Indias - Havana) (Gomez and Carvajal 2011:180; Rowland 1935: 299; Singer 1998:13-14), and during the republican period, Panama and the United States (Colón, formerly known as Aspinwall-New York) (McGuinness 2008: 6). The United States claimed Roncador’s sovereignty under The Guano Islands Act of 1856 (Burnett 2005), and years later, early in the twentieth century, Japan showed interest in establishing a naval station there (*New-York Tribune* 1913:2; Parsons 1956:25). Today, this territory belongs to the Republic of Colombia.

Fig. 2 Roncador Cay, 1835. Survey L449 Roncador Bank, surveyed by HMS *Thunder*. The National Archives of the UK Hydrographic Office Archives. Original copy from 1835 (Korea Maritime and Ocean University Library)



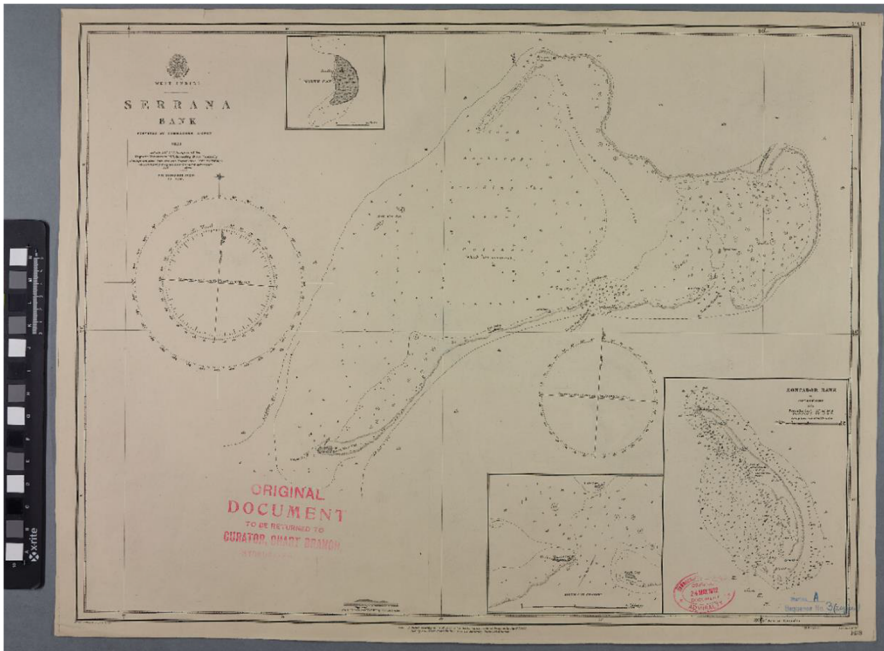


Fig. 3 Serrana Bank and Roncador Bank. OCB 1478-A3 corrected to 1912. The National Archives of the UK Hydrographic Office Archives. Original copy from 1912 (Korea Maritime and Ocean University Library)

Methodology

Sources for shipwreck identification

The data collected includes information on warships, galleons, slave ships, merchantmen, privateer ships, and steamships, mostly from digital archives, repositories, databases, libraries containing digitized information and multiple newspapers.

The Archipelago of San Andres, Old Providence, and Santa Catalina has been an important trade route used by three powers in different periods of modern history: Spain, England, and the United States (Brauer 1988; Davis 1973; Leshikar-Denton 2002; Zapatero 1990). For this reason, official information was collected from the archives of these countries such as: Archivo General de Indias-AGI (the General Archives of the Indies), The (UK) National Archives (TNA), The National Maritime Museum (Greenwich, UK), Calendar of State Papers Colonial, America and West Indies (British History Online – BHO), The British Library (historical newspaper section), the (US) National Archives and Records Administration (NARA), and the (US) Library of Congress (LC) - Chronicling America (digitalized newspaper section). Besides these sources, several chronicles and books were consulted in Spanish (Cabrera de Córdoba 1857; Fernández-Duro 1897, 1899; Romero and Perez 2005) and English (Hocking 1969; Larn and Larn 1997; Marx 1987; Sandz and Marx 2006).

Other sources on shipwrecks were analyzed, such as Lloyd's Register of Ships, as it is considered a primary source of information, with one of the world's most comprehensive databases regarding ship plans, survey reports, classifications, and wrecks in Casualty Returns with records of total losses of vessels worldwide since 1891, even though it is not a government agency (Larn and Larn 1997: 8-9). Some websites with detailed information about shipwrecks were examined, such as Maritime Archaeology Sea Trust (MAST), with the Royal Navy loss list searchable database (MAST 2020) and the UNESCO Underwater Cultural Heritage databases website. This site provides databases elaborated by external institutions worldwide, organized by regions, but without any information from the Caribbean Sea region or Roncador Cay (UNESCO 2020).

Despite the fact that Roncador is within Colombia's territorial waters, much of the information on shipwrecks is declared confidential. Access to coordinates or locations is restricted by Article 17 of the Colombia Submerged Heritage Law, from 2013 (Diario Oficial de Colombia 2013). One of the reasons is UCH's litigation between the government and salvage companies (Zenkiewicz and Wasilewski 2019), as is the case of the galleon *San Jose* sunk in 1708 during a British attack (Phillips 2007; Phillips et al. 2008).

Data collected during the colonial period was arguably questionable, and news about shipwrecks was minimal. During the Spanish navigation system of Carrera de Indias-Fleet convoy (Díaz Blanco 2018; Singer 1998:13-14), hundreds of galleons were lost in unidentified locations, by the Spaniards, across the whole West Caribbean, from Panama to the Yucatan peninsula, off the coast of Honduras, and by the British, in the West Indies (Lugo-Fernández et al. 2007; Parsons 1956:4-10). The second half of the nineteenth century presents comprehensive information due to the speed of information afforded by the telegraphic cable developing international communication networks (Kennedy 1971), permitting a meticulous analysis of the circumstances, and in some cases, the location of shipwrecks.

Nautical Charts -Data Validation

Nautical charts provided information about shipwrecks and were used to validate the accidents found during this research. Symbols and abbreviations started to be included by the 1830s under Francis Beaufort (National Library of Scotland 2020), making it valuable to identify wrecks, as is presented in the nautical chart OCB 1334-A2-Old Providence Island published in 1840 by the UK Hydrographic Office with the wreck of the HMS *Jackdaw* in 1835 (Dawson 1885:126).

The decision to research from 1804 to 1920 was made because nautical charts made before the nineteenth century are considered defective and inadequate to validate shipwrecks. Consequently, five nautical charts were found in the archives of Spain, the United Kingdom, and the United States, produced by these countries (Table 1). These charts were examined in order to find symbols or signs from shipwrecks without any correlative information. However, the first symbol of a wreck was found in the chart OCB 1218 A22, UK Hydrographic Office of 1973 at the south of Roncador Cay without relevance in this study.

Table 1 Relation of Nautical charts of Roncador Cay for shipwrecks validation

Year	Nautical Chart	Wreck info.
1804	Planos particulares de los Bajos: Las Ranas, Nuevo, Serranilla, Serrana, Roncador y de los Cayos de tro del Placer de la Vívora. Levantados por D. Joaquin F. Fidalgo. España (Nautical Chart of Low Islands: Las Ranas, Nuevo, Serranilla, Serrana, Roncador, and Pedro del Placer de la Vívora Cay by Joaquin F. Fidalgo. Spain)	No information
1835	Survey L449 Roncador Bank surveyed by HMS Thunder. UK Hydrographic Office	No information
1875	OCB 1478 -A2 corrected to 1875. UK Hydrographic Office	No information
1893	No 1374. Serrana Bank-Roncador Bank. US Hydrographic Office	No information
1912	OCB 1478-A3 corrected to 1912. UK Hydrographic Office	No information

Hurricanes in Roncador Cay and the Archipelago

Many Spanish and British documents provide evidence of hurricanes in the Caribbean Sea as early as 1492, noting that the area had a global significance of weather activity (Chenoweth 2006; Millas 1968), but it was not until the latter half of the nineteenth century, with the acceptance of the Law of Storms, that tropical cyclones were better understood (Naylor 2015:781-782). However, after that time, hurricanes that impacted areas near the archipelagic waters, such as Honduras, Nicaragua, Panama, Colombia, and Pedro Bank in Jamaica, were included in this study.

For the purpose of this research, databases, articles, and books were analyzed (Chenoweth 2006; Cochran 2012; Fernández-Partagás and Diaz 1996; García-Herrera et al. 2005; García-Herrera et al. 2007; Millas 1968; Poey 1855; Rappaport and Fernández-Partagás 1995). Also, the National Oceanic and Atmospheric Administration (NOAA) provides a reanalysis of historical hurricane tracks from 1852 to 2016 online that facilitates research of previous hurricane paths. This tool allows users to choose a location (Roncador in this case) and selected tropical cyclones according to the Saffir-Simpson Hurricane Wind Scale. Willoughby and Rahn (2004), however, stated that hurricane winds damage a radius of 100 to 150 km, so a range of 180 nautical miles was applied to Roncador Cay through the NOAA interactive mapping tool, covering the archipelago and the navigation route in the area (NOAA 2020). With these parameters, hurricanes detected from 1492 to 1920 were classified in a table of four columns with the year, month (as stated in the sources), location affected or impacted (the nearest identifiable place in the area), and sources (Table 2).

Analysis of shipwrecks sources and its relation with hurricanes

After undertaking research utilizing multiple sources, shipwreck results were analyzed to validate the loss circumstances and details. Later, the identification of hurricanes in the archipelagic waters and the use of nautical charts to explore shipwrecks provided better comprehension of the sources' information,

Table 2 Hurricanes on Roncador Cay and ASAPSC, 1492–1920

Year	Month	Locations Affected or Impacted	Sources
1502	September	Honduras	Rappaport and Fernández-Partagás 1995:26
1525	Unknown	Honduras	García-Herrera et al. 2005:D03109.
1528	June	Southern Caribbean Sea- Serrana Bank	Millas 1968: 57
1531	Unknown	Vicinity of Serrana Bank located in a range of 50 nautical miles from Roncador Cay	Millas 1968:62
1551	Unknown	Honduras	Millas 1968:72
1588	November	Cartagena de Indias	García-Herrera et al. 2005:D03109
1605	November	confirm Caribbean Sea near to Serramilla Bank- Nicaragua	Millas 1968:98; Rappaport and Fernández-Partagás 1997:99; García-Herrera et al. 2007:60-64.
1675	September	South Caribbean Sea. Cuba-Mexico.	García-Herrera et al. 2005:D03109; Rappaport and Fernández-Partagás 1995:28.
1681	Unknown	Western Caribbean Sea	Millas 1968:149-150; Rappaport and Fernández-Partagás 1995:28
1708	November	The southern part of Western Caribbean Sea-Cartagena de Indias	Millas 1968:165 98; Rappaport and Fernández-Partagás 1995:22
1730	September	Pedro Bank (Vibora Bank)	Millas 1968:182-183;Chenoweth 2006:195
1761	November	Cartagena de Indias	Chenoweth 2006:211
1762	December	Cartagena de Indias	Millas 1968:215-216; Poey 1855:298
1773	September	Cartagena de Indias	García-Herrera et al. 2005:D03109
1787	September	Honduras	Poey 1855:301; Millas 1968:278; Rappaport and Fernández-Partagás 1995:23; Cochran 2012:97-98.
1801	July	Gulf of Mexico	Poey 1855:302; García-Herrera et al. 2005:D03109.
1817	October	Nicaragua	Chenoweth 2006:225
1818	November	Southwest Caribbean Sea	Poey 1855:305; Chenoweth 2006:225
1852	September	Serrana Bank-Nicaragua	NOAA. Historical hurricane tracks 1852, Not named 2020
1857	September	Bajo Nuevo Bank-Serramilla Bank-Gulf of Honduras	NOAA. Historical hurricane tracks 1857, Not Named 2020
1870	Unknown	Caribbean Sea	Fernández-Partagás and Diaz 1996:2903
1876	September	San Andres Island-Nicaragua	NOAA. Historical hurricane tracks 1887, Not named 2020
1877	September	Bajo Nuevo Bank-Serramilla Bank	NOAA. Historical hurricane tracks, 1877, Unnamed 2020

Table 2 (continued)

Year	Month	Locations Affected or Impacted	Sources
1887	July	Bajo Nuevo Bank-Serramilla Bank	NOAA. Historical hurricane tracks 1887, Unnamed 2020
1887	November	San Andres Island-Nicaragua	NOAA. Historical hurricane tracks 1887, Not named 2020
1890	October	Nicaragua- Honduras	NOAA. Historical hurricane tracks 1890, Unnamed 2020
1892	October	San Andres and Old Providence Island-Nicaragua-Honduras	NOAA. Historical hurricane tracks 1892, Unnamed 2020
1893	July	Old Providence Island-Nicaragua-Honduras	NOAA. Historical hurricane tracks 1893, Unnamed 2020
1895	October	Bajo Nuevo Bank-Serramilla Bank-Cuba	NOAA. Historical hurricane tracks 1895, Unnamed 2020
1898	September	Roncador Cay-Serrana Bank-Gulf of Mexico	NOAA. Historical hurricane tracks 1898, Not named 2020
1906	October	Cartagena-Nicaragua-Honduras	NOAA. Historical hurricane tracks 1906, Unnamed 2020
1908	October	San Andres Island-Nicaragua	NOAA. Historical hurricane tracks 1908, Unnamed 2020
1910	October	Old Providence Island-Roncador Cay	NOAA. Historical hurricane tracks 1910, Unnamed 2020
1911	September	San Andres Island-Nicaragua	NOAA. Historical hurricane tracks 1911, Unnamed 2020; Plazas et al. 2011: 14
1912	November	Roncador Cay-Jamaica	NOAA. Historical hurricane tracks 1912, Unnamed 2020
1918	August	Bajo Nuevo Bank-Serramilla Bank-Honduras	NOAA. Historical hurricane tracks 1918, Unnamed 2020.

permitting a determination of the relationship between shipwrecks and hurricanes or other causes.

No 1. Unidentified (1531). This shipwreck is based on the narrative of Maestre Juan, a Spanish sailor who was shipwrecked on Serrana Bank in 1528, living there eight years before being rescued. After three years on the island, two men sailed to Serrana Bank on a raft from one of the nearby islands of the 17 described by Maestre Juan around Serrana (Domènech 2020:179-182; Fernández-Duro 2009/1867: 50; Herrera y Tordesilla 1730:83-85; Juan 1782). Juan never clarified where the other shipwreck occurred, but assumed that the ship went down close to the nearest island, Roncador Cay. Uncertainty was generated about the area of this case (Millas 1968: 62), but as Juan was able to communicate with the other men in Castellano (Castilian), it could be presumed that the shipwreck was Spanish. Due to the ambiguous information, the cause of the shipwreck was not determined.

No 2. *Capitana-San Roque* (November 11, 1605). *San Roque* was the *capitana* (flagship) of the Spanish Armada, which was composed of seven galleons (Cerezo 2001:97) and commanded by Captain-General Luis Fernández de Córdoba (Pajuelo 2019:188). The fleet was struck by a hurricane and lost four ships between Serranilla and Serrana Bank, located about 50 nautical miles from Roncador Cay (Fernández-Duro 1897:253; García-Herrera et al. 2007:60-63; Millas 1968:98; Romero and Perez 2005:157; Segovia 2007:188). However, this location is exceptionally ambiguous because the fleet could not estimate their position with celestial navigation instruments due to the weather conditions (Segovia 2007:188).

Added to this ambiguity, some authors debate the year of this shipwreck, occurring between 1604 and 1606 (Fernández-Duro 1897:488). One of the first reports of the incident is from 1605 on a letter to the king from the Governor of Havana, informing him that the galleon *San Gregorio* reported the fleet was located at 15.5° between Serrana and Serranilla Bank (Valdés 1605). Other sources documented the ships lost in several places as are the Caribbean Sea (Cabrera de Córdoba 1857:292), on the coast of Honduras (García-Herrera et al. 2007:64; Pajuelo 2019:193), Pedro Bank (Hoyt 1984: 102), Cumana, Venezuela (Pérez-Mallaina 1997:106; Serrano 1991:81), and between Cartagena de Indias and Cuba on an unidentified island so-called the “Mysterious island” described by the Flemish pilot, Simón Zacarías that may be the Swan Islands (Islas Santillana) (Gaspar de Palacios 1688).

Nevertheless, Millas (1968) noted that it was unlikely that tropical cyclones would occur on Venezuela’s coasts, determining that it was closer to Serranilla Bank and its surroundings (Millas 1968:98). For that reason, it may be dispersed in the archipelagic waters due to the hurricane intensity (Segovia 2007:200), generating an area of uncertainty, including Roncador Cay, Serrana Bank, Serranilla Bank, and Bajo Nuevo Bank though its location remains undetermined.

No 3. *Almiranta-Santo Domingo* (November 11, 1605). This galleon was the *almiranta* (vice-flagship) of the fleet of Luis Fernández de Córdoba along with *San Roque* (Cerezo 2001:97), and suffered the same consequences as other ships in

the fleet, from contact with a hurricane (Pajuelo 2019; Segovia 2007). During the marine accident, it was lost in an area of uncertainty near Roncador Cay.

No 4. *Nuestra Señora de Begoña* (November 11, 1605). Another galleon of Luis Fernández de Córdoba it also suffered the same fate as other ships (Pajuelo 2019; Segovia 2007). Its location is still unknown, generating an area of uncertainty on Roncador Cay.

No 5. *San Ambrosio* (November 11, 1605). This vessel was also from the fleet of Luis Fernández de Córdoba (Pajuelo 2019; Segovia 2007) and located in an area of uncertainty on Roncador Cay.

No 6. Unidentified (1636). Newton (1914) describes that in 1636, five men stole a shallow boat to escape from the puritan rule in Old Providence Island, pretending to intercept a Spanish frigate patrolling near the Cape Gracias a Dios. However, they shipwrecked in Roncador Cay, and four of them perished. The survivor was rescued by a Dutch merchant vessel near Roncador in February 1639 (Feiling 2018:121; Jameson 2010 [1923]:5; Milliman 1969:14; Newton 1914: 277). The causes of the shipwreck were not identified.

No 7. *Santiago* (1659). The galleon *Santiago* apparently was part of the Márquez de Villarubia's Flota de Tierra Firme (Spanish Fleet) sailing between Cartagena de Indias and Havana (Márquez 2018:49). This wreck, along with that of the galleon *San Martin*, could be in a number of different locations, including the along the coasts of central American countries (Fernández-Duro 1899:437), between Quitasueño and Roncador Bank (Romero and Perez 2005:176; Serrano 1991:36). Márquez (2018) mentioned a wreck on Chinchorro Bank, which may be the *Santiago* (Márquez 2018:46). Nevertheless, the exact location needs to be clarified, as Roncador Cay is also a debated resting place. The cause of the shipwreck was deemed human error (Serrano 1991:36).

No 8. Unidentified (1675). Marx (1987) described a sizable Dutch warship shipwrecked in Roncador (Marx 1987: 416). Underwater cultural heritage information from the Dutch Cultural Heritage Agency is available through the Maritime Stepping Stones-MaSS and Managing Cultural Heritage Underwater (MACHU), the worldwide shipwreck database, but do not contain any information on this shipwreck (Cultural Heritage Agency 2020). As such, the cause of the shipwreck is not identified.

No 9. *El Paysano* (1801). This shipwreck was documented in an unspecified area near San Andres Island with the crew lost (Marx 1987: 417). This ambiguous information allowed localizing it in an area of uncertainty near Roncador as the cay is in the vicinity of the island. The causes of the shipwreck were not identified.

No 10. *Dolorita* (July 1837). There is documentation of this ship's activities in the Atlantic slave trade coming from the "Havana Slave Trade Commission" (Lovejoy 2016) with illegal movements between Africa and Cuba (Curtin and Klein 1973; Foreign and Commonwealth Office 1837:169; House of Commons 1828:27, 142–152). During the marine accident, *Dolorita* was sailing from Kingston to San Juan de Nicaragua (formerly known as Greytown or San Juan del Norte), and the news was documented in England due to the death of a British citizen (Coventry Herald 1837:4). Even with documented knowledge of this vessel's movements, what caused it to be wrecked has not been established.

No 11. *Amity* (March 1840). Bard (1855:34–55) wrote of a ship that was wrecked on Roncador Cay when it was sailing to Mosquito Coast. Olien (1988) stated that there are several sources for this story. The most likely is found in "*Narrative of a residence on the Mosquito shore, during the years 1839, 1840 & 1841*" by T. Young (1842). He described his ship wrecking on a bank (conceivably Roncador Cay) in March of 1840 while sailing from Cape Gracias a Dios to Black River's British settlement on board the schooner *Amity* with a total loss of the ship (Olien 1988:32; Young 1842:37–51). However, even with the seemingly accurate account of the ship wrecking, the cause has not been identified.

No 12. *Clarendon* (February 27, 1852). Some newspapers in America reported the vessel being wrecked, but with passengers and crew safe (*Mountain Sentinel* 1852:1; *New-York Daily Tribune* 1852:8; *New York Times* 1852:1; *Republic* 1852:3). The United States consul in Cartagena de Indias sent a letter that year to the Department of State reporting the accident (American Seamen's Friend Society 1853:86). Lloyd's Register of Ships (1835) has information on the ship's characteristics, however, the reason for the shipwreck were not determined.

No 13. Unidentified (September 1857). This shipwreck has minimal information documented in a newspaper in England as a large vessel lost on Roncador Cay sailing from Greytown (San Juan) but without more details (*Northern Daily Times* 1857: 8).

No 14. *Golden Rule* (May 30, 1865). The *Golden Rule* ran aground (Fig. 4) with 632 passengers and 100 crew members on the cay where they spent ten days in the "*most miserable conditions*" (Fig. 5) (*Harper's Weekly* 1865:420; Hopkins 1877:17; *Missionary Herald* 1865: 231–232; *New York Times* 1865: 5; Robinson 1907:74–79). The USS *State of Georgia* and USS. *Huntsville* rescued the castaways (Naval Historical Center 1976:609). The accident was caused by heavy rain and regional geomorphology (*New York Times* 1865: 5).

No 15. *CC Clark* (July 5, 1870). *Clark* was reported as a total loss on Roncador Cay in the Shipping Section-Marine Disasters of the *New York Herald* (1870:10) but without more detail.

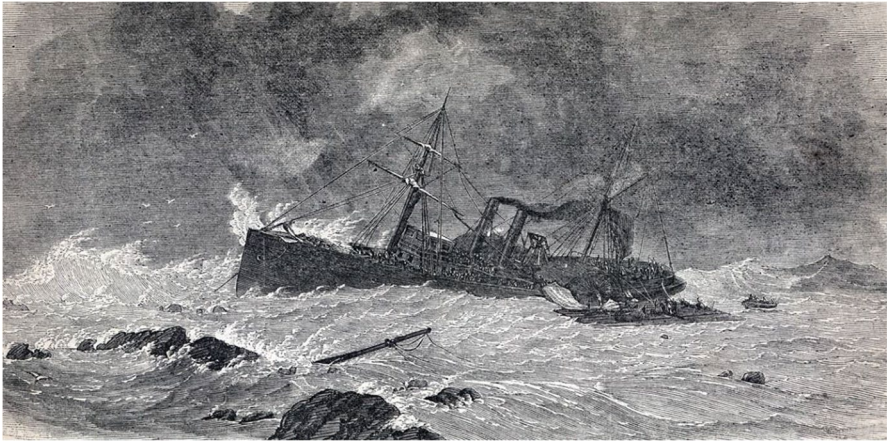


Fig. 4 Wreck of the SS *Golden Rule*, Caribbean Sea, May 30, 1865, artist's impression. (House Divided: The Civil War Research Engine at Dickinson College 2015a)

No 16. *Hiram* (February 12, 1886). This Norwegian bark was sailing from Aspinwall, Panama (now named Colón) to Pensacola, Florida (*Savannah Morning News* 1886a:7) when wrecked on Roncador Cay. After the accident, the crew sailed to Aspinwall in their lifeboats, covering more than 250 nautical miles in 54 hours (*New-York Tribune* 1886:3). They were transported from Aspinwall by the Pacific

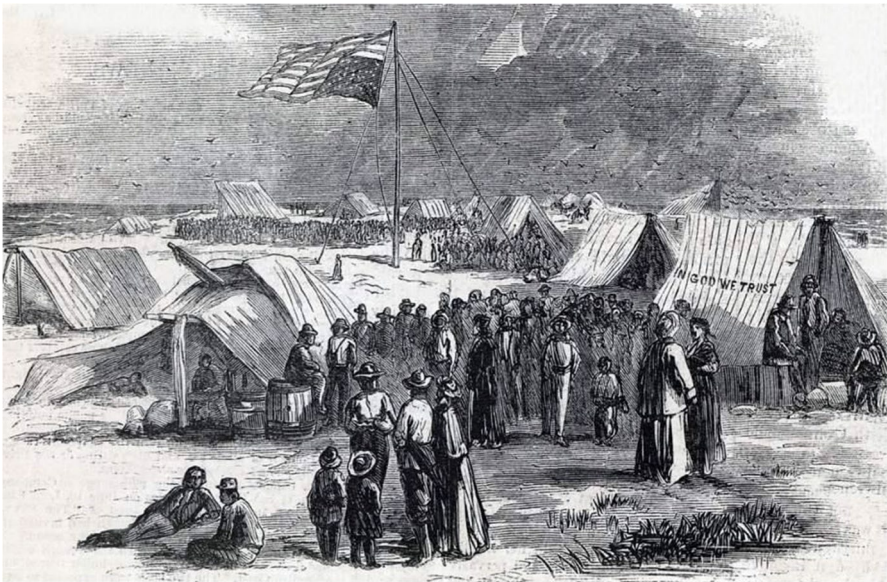


Fig. 5 Survivors of the wreck of the steamer *Golden Rule*, on Caribbean coral island of El Roncador, May 1865, artist's impression. (House Divided: The Civil War Research Engine at Dickinson Col-

Mail Steamer *City of Para* and reported safe in New York (*New York Times* 1886:5; *Savannah Morning News* 1886b:7). The reason for the shipwreck was not identified.

No 17. Unidentified (1889). Although there were details in two newspapers covering the wrecks, *Aguan* in 1891 and the USS *Kearsarge* in 1894, information about an unnamed steamship wreck on the east side of Roncador was not precise, other than mentioning the crew were safe on San Andreas Island, having made their way there in the ship's boats. The wreck of this steamship was seen by *Aguan* passengers during their accident two years later (*New York Times* 1891a, b, c:9; 1894b:2).

No 18. *Ydun* (February 12, 1890). Little information was reported about the wrecking of the vessel, *Ydun*, other than *The Morning News* (1890a, 1890b:3) reporting the cay's name as "Rancador" rather than Roncador. The fate of the *Ydun* was also mentioned in England without any further details of the accident (*New York Times* 1894b:2; *Shipping Gazette and Lloyd's List* 1890:8).

No 19. *Aguan* (February 26, 1891). This shipwreck was well documented for having onboard Warner Mille, a United States representative and senator from New York, during his trip to Nicaragua for the Canal Project (*Evening World* 1891:1; *Lloyd's Register Casualty Returns* 1891:6; *New York Times* 1891a:1, 1891b:1; *New York Times* 1891c:9). Spears (1891) makes a detailed account of the shipwreck and the castaway's stay on Roncador Cay before being rescued (Spears 1891:5). The ship's characteristics are available in the "Report for Survey for Repairs" (*Lloyd's Register of Ships* 1887). The accident was caused by the trade winds and strong currents (Spears 1891:5).

No 20. USS *Kearsarge* (February 2, 1894). The USS *Kearsarge* is considered the most famous and glorious ship of the American Civil War, sinking the Confederate State Ship-CSS *Alabama*, in 1864 (Gomez-Pretel and Jeong 2020:15; Guérout

Fig. 6 USS *Kearsarge* on Roncador reef. Caribbean Sea, 1894. Photograph of a drawing, by E. H. Hart, 1894, drawn by Chris Johnson, U.S.N. Feb. 3, 1894 on negative (Library of Congress)



1988; Marvel 2007). After being wrecked on Roncador Cay (Fig. 6) the *Kearsarge* was abandoned with armaments onboard (seven guns). Primary sources are the Log-book of the USS *Kearsarge* (Heyerman 1894a), Report from the Commander to the Commander in Chief of the United States Naval Force (Heyerman 1894b) and the court-martial (Lemly 1894; US Hydrographic Office 1894; USS *Kearsarge* 1894). Other information on the accident and ship characteristics can be found in various articles and books (Burns 1894; Canney 1990:61-90; Dudley 1998:105-109; Hocking 1969:377). The press widely covered this incident which left an indelible mark in the United States, in the US Navy and American society (Dudley 1998; Hobson 1894; *New York Times* 1894a:1-2). Strong currents to the northwest in a different direction to the vessel's course were blamed for the drift which caused the accident (Burns 1894:672; Gomez-Pretel and Jeong 2020:22-23).

No 21. *Kitty* (November 19, 1902). A ship from the United Fruit Company was reported as a wreck in “Runcador” by the press (*New York Times* 1902:6; *New-York Tribune* 1902:2) and “Roncador” in Casualty Returns (Lloyd's Register Casualty Returns 1902:8). The *Kitty* was from Norway, and the website Skipshistorie (ship history) has documented characteristics and shipwreck details (Skipshistorie 2017). The causes of the shipwreck were not identified.

No 22. *Buckingham* (December 12, 1904). The fate of the *Buckingham* was reported by various newspapers in England (*Shields Daily News* 1904:3; *Western Times* 1904:4). Hocking (1969:108) documented this accident on a compilation of disasters at sea. The accident and characteristics of the ship were found on Lloyd's Register of Ships (1897; Lloyd's Register Casualty Returns 1904:7). The causes of the shipwreck were not determined.

No 23. *Mayport* (January 25, 1920). Reported as a total loss on Roncador Cay during navigation between Norfolk to Colón. (De Tankerville 1920:30; Lloyd's Register Casualty Returns 1920:8; *Scotsman* 1920:4; Shipbuilding and Shipping Record 1920:148). The causes of the shipwreck were not identified.

Shipwreck Database

The 23 shipwrecks recorded during this research are presented below in a table (Table 3) with the following information: Ship Number (as per above), Year of Loss (as indicated above), Name of Ship (“Unidentified” where no information was found), Vessel type, Construction material of vessel, Gross Tonnage, Cargo, Vessel's Last Route, Manner of Loss, Location of the Incident (Area of Uncertainty, when the report is not precise), Vessel's Nationality and Reported Casualties. Shipwrecks with no information are shown as Not Available-“N/A.” The objective of this database is to serve as a tool for future underwater research in Roncador Cay or the archipelago.

Table 3 Shipwrecks database on Roncador Cay, 1492–1920

No	Year of Loss	Name	Type	Constr.Mate- rial	Gross Ton	Cargo	Voyage from/ to	Manner of Loss	Location on Roncador	Nation	Casualties
1	1531	Unidentified	N/A	Wood	N/A	N/A	Unknown	Unidentified	Area of uncertainty	Spain	N/A
2	1605 Nov. 11	<i>San Roque</i>	Galleon	Wood	600	Silver bars Gold bars	Cartagena de Indias- Havana	Hurricane	Area of uncertainty	Spain	339
3	1605 Nov. 11	<i>Santo Domingo</i>	Galleon	Wood	747	Silver bars Gold bars	Cartagena de Indias- Havana	Hurricane	Area of uncertainty	Spain	263
4	1605 Nov. 11	<i>Nuestra Señora de Begoña</i>	Galleon	Wood	500	Silver bars Gold bars	Cartagena de Indias- Havana	Hurricane	Area of uncertainty	Spain	240
5	1605 Nov. 11	<i>San Ambrosio</i>	Galleon	Wood	450	Gold bars Silver bars	Cartagena de Indias- Havana	Hurricane	Area of uncertainty	Spain	220
6	1636	Unidentified	Shallop	Wood	60	N/A	Old Providence- Mosquitia Coast	Unidentified	West Area	Britain	3
7	1659	<i>Santiago</i>	Galleon	Wood	450	N/A	Cartagena de Indias- Havana	Human error	Area of uncertainty	Spain	N/A
8	1675	<i>Unidentified</i>	Warship	Wood	N/A	N/A	N/A	Unidentified	N/A	Dutch	N/A
9	1801	<i>El Pysano</i>	Merchantman	Wood	260	N/A	Kingston-San Juan (Grey- town)	Unidentified	Area of uncertainty	Spain	N/A
10	1837 July	<i>Dolorita</i>	Schooner	Wood	120	N/A	Kingston-San Juan (Grey- town)	Unidentified	N/A	Spain	1

Table 3 (continued)

No	Year of Loss	Name	Type	Constr. Mate- rial	Gross Ton	Cargo	Voyage from/ to	Manner of Loss	Location on Rocador	Nation	Casualties
11	1840 March	<i>Amity</i>	Schooner	Wood	60	N/A	Cape Gracias a Dios- Black River (settlement)	Unidentified	N/A	Britain	0
12	1852 Feb. 27	<i>Clarendon</i>	Schooner	Wood	308	General Cargo	New York- San Juan (Greytown)	Unidentified	N/A	Britain	0
13	1857 Sept.	Unidentified	Vessel	Wood	N/A	N/A	San Juan (Greytown)	Unidentified	N/A	N/A	N/A
14	1865 May 30	<i>Golden Rule</i>	Paddle steamer	Wood	2267	Passengers	New York- San Juan (Greytown)	Heavy rain	North-East Area	United States	0
15	1870 Jul. 5	<i>CC Clark</i>	Schooner	Wood	80	General Cargo	Aspinwall (Colón)- Baltimore	Unidentified	N/A	United States	0
16	1886 Feb. 12	<i>Hiram</i>	Bark	Wood	N/A	General Cargo	Aspinwall (Colón)- Pensacola	Unidentified	N/A	Norway	0
17	1889	Unidentified	Steamship	N/A	N/A	N/A	Savannah- Bluefields	Unidentified	North-East Area	N/A	N/A
18	1890 Feb. 12	<i>Ydun</i>	Steamship	Steel	362	Fruits	Bluefields- Savannah	Unidentified	South Area	Norway	8
19	1891 Feb. 26	<i>Aguan</i>	Steamship	Steel	1618	Passengers	New York- Kingston- San Juan (Greytown)	Strong currents- trade winds	North-East Area	Britain	0

Table 3 (continued)

No	Year of Loss	Name	Type	Constr. Mate- rial	Gross Ton	Cargo	Voyage from/ to	Manner of Loss	Location on Roncador	Nation	Casualties
20	1892 Feb. 2	USS <i>Kearsarge</i>	Sloop of War	Wood	960	Seven Guns	Port Prince -Bluefields	Strong cur- rents	North-East Area	United States	1
21	1902 Nov. 19	<i>Kitty</i>	Steamship	Steel	1000	Fruits	Charleston- Bocas del Toro	Unidentified	N/A	Norway	0
22	1904 Dec. 12	<i>Buckingham</i>	Steamship	Steel	2879	General Cargo	Baltimore- Bocas del Toro	Unidentified	N/A	Britain	0
23	1920 Jan. 25	<i>Mayport</i>	Steamship	Wood	2551	Ballast	Norfolk- Colón	Unidentified	N/A	United States	0

Results

For the purposes of this study, 23 shipwrecks were classified, and 37 hurricanes were detected from 1492 to 1920 (Fig. 7), including 16 newly-added shipwrecks. The analysis has revealed four accidents caused by hurricanes and three by environmental conditions (regional geomorphology, strong currents, and heavy rain); one by human error and 15 by unidentified causes. Even though García-Herrera et al. (2005), Lugo-Fernández et al. (2007) and Trouet et al. (2016) stated hurricanes as one of the leading causes of shipwrecks in the Caribbean Sea; however, the result of four shipwrecks caused by hurricanes does not support their observation in the area of research. As such, it can be argued that, the findings reveal no correlation between hurricanes and shipwrecks on Roncador Cay.

The sixteenth century had a high frequency of hurricanes (García-Herrera et al. 2005:D03109), but with minimal information on shipwrecks because the region was relatively unknown and without accurate geographical maps (Sutton and Yingling 2020:791-792). During the seventeenth century, the number of shipwrecks detected was high compared with hurricanes (Fig. 7). The colonization process in the Caribbean by the Spanish, and the establishment of a puritan settlement on Old Providence Island in 1629, by the British, are two plausible reasons why the number of shipwrecks increased, during this time (Kupperman 1993:1-2; Rowland 1935:298). In this period, the vessels that suffered from maritime accidents belonged to the Spanish, British, and Dutch representing their presence at the Caribbean Sea (Fig. 8). Hurricane activity in the eighteenth and first half of the nineteenth centuries was very high (Cochran 2012; Poey 1855), but the total number of shipwrecks was low in comparison because of the disruption of maritime trade as a result of the hostilities and wars between Spain and Britain (Phillips 2007) as was the War of Jenkins' Ear (known as Guerra del Asiento in Spain) (Gomez and

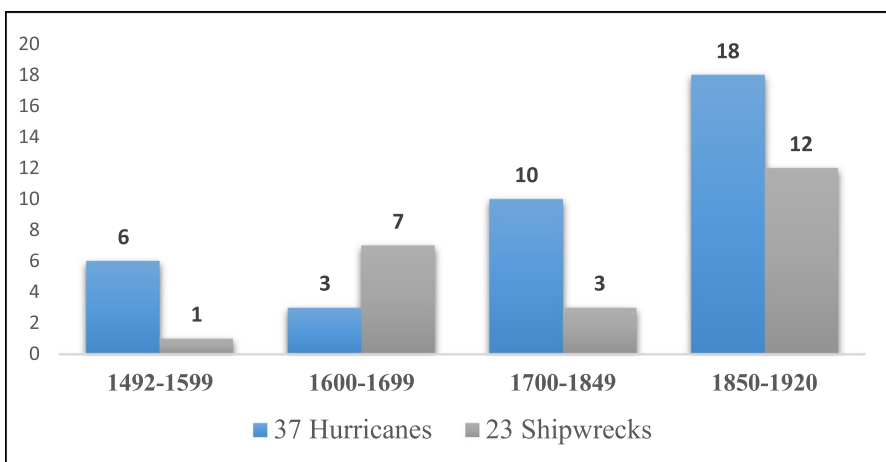


Fig. 7 Shipwrecks and hurricanes from 1492 to 1920. Twenty-three shipwrecks and 37 hurricanes were compiled and classified by centuries and periods (Own elaboration)

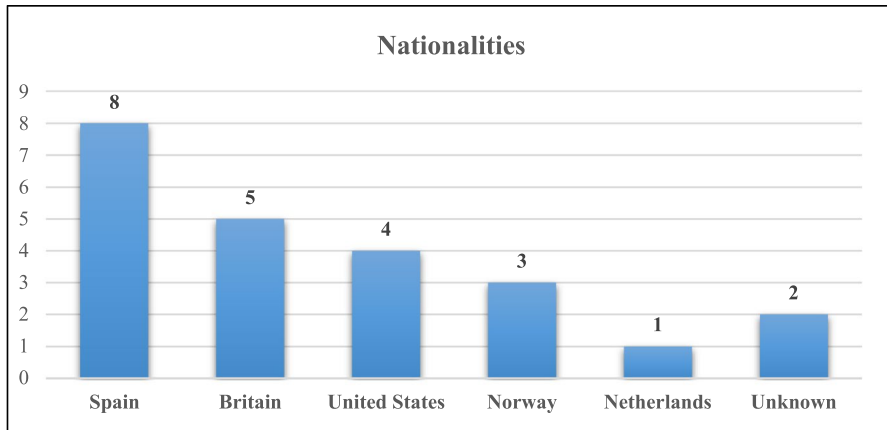


Fig. 8 Countries of shipwrecked vessels 1492-1920. Five countries were detected showing their influence in the Caribbean Sea, and two shipwrecks with no information

Carvajal 2011:180-181; Temperley 1909; Zapatero 1990) and the independence of certain colonies in the Caribbean area (Bosch 2009).

The last period covered (1850-1920), saw the highest frequency of events detected, with many reasons for this. On the one hand, technology allowed better and faster communications (Kennedy 1971:728); while on the other hand, new navigation routes were activated by Americans, to and through Panama during the California Gold Rush (Kemble 1949) and Britain with British Honduras through Jamaica (Craig 1969). The interest in an interoceanic canal through Panama or Nicaragua expanded the United States' military and naval presence (Fig. 8), especially in Haiti, Nicaragua, and Panama (Bosch 2009:7-11; Mahan 1890, 2012 [1890]). Other factors increasing navigation in the archipelago were the massive guano deposits resulting in the Guano Island Act of 1856 (Burnett 2005; Ratter 2018: 100-101) and other countries' interests as Japan due to its proximity to the Panama Canal. (*Alexandria Gazette* 1913:4; *New-York Tribune* 1913:2; *Washington Herald* 1913:4).

In seeking to analyze when hurricanes are most prevalent, it is clear that September is the month with peak activity (Fig. 9). Research indicates, however, that a correlation of shipwrecks to hurricanes occurred in November, with five cases resulting from hurricanes in 1605 alone. February saw the same number of shipwrecks, but these are over the entire period (Fig. 9). Perhaps the most striking result is from the number of shipwrecks that occurred outside the regular Atlantic hurricane season. The incidents involving the *Aguan* and *USS Kearsarge*, (both in February) and the *Golden Rule* (in the month of May) were associated with regional geomorphology, cold fronts, strong currents, and extreme wave heights in the Caribbean Sea (Burns 1894:680; *New York Times* 1891a, b, c:9; *New York Times* 1894c:9; Ortiz-Royero et al. 2013:2798). Unfortunately, due to the restricted and ambiguous information on most of the shipwreck findings, it was impossible to determine the causes of most marine accidents.

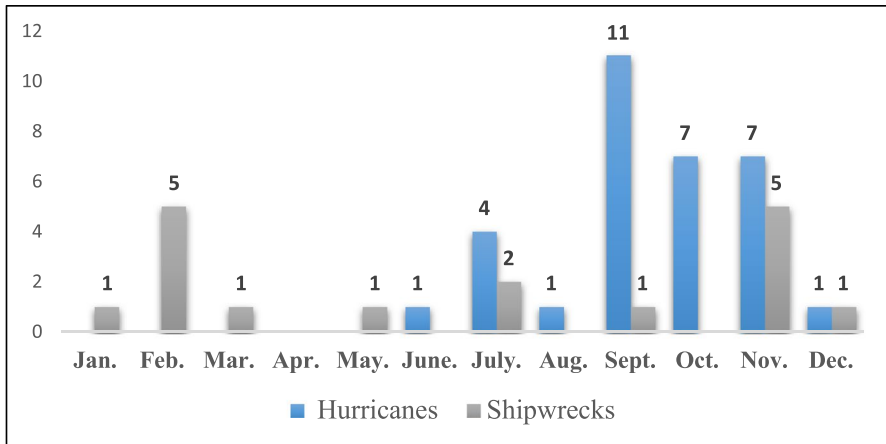


Fig. 9 Frequency of detected hurricanes and shipwrecks by months, 1492–1920. Information on months in years before 1850 is not accurate or available for both events

Concluding Remarks

This article compiled the search results for shipwrecks considering underwater cultural heritage (UCH) and hurricanes from 1492 to 1920 and its relationship, highlighting the importance of UCH as an indicator of the active maritime past, reflecting sociocultural processes, technological advances, independence of Spanish colonies, and the American imperialism in the Caribbean (Brauer 1988).

Different sources were analyzed with results of 23 marine accidents in Roncador Cay, providing information on 16 unrecorded shipwrecks and reviewing seven shipwrecks previously recorded by different authors. Information on hurricanes showed an outcome of 37 tropical cyclones near Roncador Cay and the archipelago waters. The research detected a lack of information and toponymical problems (Parsons 1956), especially before the nineteenth century. For this reason, some accidents were documented in an “Area of Uncertainty,” near Roncador Cay, as the archipelago is comprised of many banks and cays, making the identification of sites difficult.

Information obtained from 1700 to 1800 clearly showed interruptions in maritime trade with no evidence of shipwrecks on the cay as a result of war, with most of the accidents located near Portobello or Cartagena de Indias (Kupperman 1993:355; Martin et al. 2020; Phillips 2007; Phillips et al. 2008)

Despite storm activity and hurricanes being considered leading causes of Spanish shipwrecks during colonial times in the Caribbean, most accidents compiled occurred by unspecific causes with no direct relationship to hurricanes. Nevertheless, shipwrecks were influenced by environmental conditions, such as regional geomorphology, severe weather events, or currents (Luckman 2019:104–106). Consequently, a lighthouse was placed in Roncador Cay in June 1919 by the United States Government to avoid this area’s danger (Nicaragua v. Colombia 2008:160; US Department of Commerce, Light House Service 1923: 85).

This research indicates strong evidence of numerous marine accidents caused by cold front weather conditions (Ortiz-Royero et al. 2013) and regional geomorphology as primary factors of shipwreck concentration in the archipelagic waters. Therefore, this area should be recognized as a trap for vessels (Gould 2011:82-83; Throckmorton 1964:51-61) with evidence of shipwrecks on other islands, cays, and banks, found during this study, which needs to be reviewed in detail (Gilly 1857; Hocking 1969; Lemaitre 1993:237; Marx 1987; Perez 2019; *Portland Daily Press* 1877:2; Romero and Perez 2005; Sandz and Marx 2006; *Nautical Magazine* 1835: 435-436).

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Declarations

Conflict of Interest The authors declares that they have no conflict of interest.

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