= Waterspout =

A waterspout is an intense columnar vortex (usually appearing as a funnel @-@ shaped cloud) that occurs over a body of water . They are connected to a towering cumuliform cloud or a cumulonimbus cloud . In the common form , it is a non @-@ supercell tornado over water .

While it is often weaker than most of its land counterparts , stronger versions spawned by mesocyclones do occur . Most waterspouts do not suck up water ; they are small and weak rotating columns of air over water .

While waterspouts form mostly in the tropics and subtropical areas , other areas also report waterspouts , including Europe , New Zealand , the Great Lakes and Antarctica . Although rare , waterspouts have been observed in connection with lake @-@ effect snow precipitation bands .

Waterspouts have a five @-@ part life cycle : formation of a dark spot on the water surface , spiral pattern on the water surface , formation of a spray ring , development of the visible condensation funnel , and ultimately decay .

= = Formation = =

Waterspouts exist on a microscale , where their environment is less than two kilometers in width . The cloud from which they develop can be as innocuous as a moderate cumulus , or as great as a supercell . While some waterspouts are strong and tornadic in nature , most are much weaker and caused by different atmospheric dynamics . They normally develop in moisture @-@ laden environments as their parent clouds are in the process of development , and it is theorized they spin as they move up the surface boundary from the horizontal shear near the surface , and then stretch upwards to the cloud once the low level shear vortex aligns with a developing cumulus cloud or thunderstorm . Weak tornadoes , known as landspouts , have been shown to develop in a similar manner . More than one waterspout can occur in the same vicinity at the same time . As many as nine simultaneous waterspouts have been reported on Lake Michigan .

= = Types = =

= = = Non @-@ tornadic = = =

Waterspouts that are not associated with a rotating updraft of a supercell thunderstorm are known as " non @-@ tornadic " or " fair @-@ weather waterspouts " , and are by far the most common type . Fair @-@ weather waterspouts occur in coastal waters and are associated with dark , flat @-@ bottomed , developing convective cumulus towers . Waterspouts of this type rapidly develop and dissipate , having life cycles shorter than 20 minutes . They usually rate no higher than EF0 on the Enhanced Fujita scale , generally exhibiting winds of less than 30 m / s (67 mph) .

They are most frequently seen in tropical and sub @-@ tropical climates , with upwards of 400 per year observed in the Florida Keys . They typically move slowly , if at all , since the cloud to which they are attached is horizontally static , being formed by vertical convective action instead of the subduction / adduction interaction between colliding fronts . Fair @-@ weather waterspouts are very similar in both appearance and mechanics to landspouts , and largely behave as such if they move ashore .

= = = Tornadic = = =

" Tornadic waterspouts " , also accurately referred to as " tornadoes over water " , are formed from mesocyclonic action in a manner essentially identical to traditional land @-@ based tornadoes in connection with severe thunderstorms , but simply occurring over water . A tornado which travels from land to a body of water would also be considered a tornadic waterspout . Since the vast majority of mesocyclonic thunderstorms occur in land @-@ locked areas of the United States , true

tornadic waterspouts are correspondingly rarer than their fair @-@ weather counterparts in that country . However , in some areas , such as the Adriatic , Aegean and Ionian seas , tornadic waterspouts can make up half of the total number .

= = = Snowspout = = =

A winter waterspout , also known as a snow devil , an icespout , an ice devil , a snownado , or a snowspout , is an extremely rare instance of a waterspout forming under the base of a snow squall . The term " winter waterspout " is used to differentiate between the common warm season waterspout and this rare winter season event . Very little is known about this phenomenon and only six known pictures of this event exist to date , four of which were taken in Ontario , Canada . There are a couple of critical criteria for the formation of a winter waterspout . Very cold temperatures need to be present over a body of water warm enough to produce fog resembling steam above the water 's surface . Like the more efficient lake @-@ effect snow events , winds focusing down the axis of long lakes enhance wind convergence and likely enhance their development .

= = Climatology = =

Though the majority occur in the tropics , they can seasonally appear in temperate areas throughout the world , and are common across the western coast of Europe as well as the British Isles and several areas of the Mediterranean and Baltic Sea . They are not restricted to saltwater ; many have been reported on lakes and rivers including the Great Lakes and the St. Lawrence River . Waterspouts are fairly common on the Great Lakes during late summer and early fall , with a record 66 + waterspouts reported over just a seven @-@ day period in 2003 . They are more frequent within 100 kilometers (60 mi) from the coast than farther out at sea . Waterspouts are common along the southeast U.S. coast , especially off southern Florida and the Keys and can happen over seas , bays , and lakes worldwide . Approximately 160 waterspouts are currently reported per year across Europe , with the Netherlands reporting the most at 60 , followed by Spain and Italy at 25 , and the United Kingdom at 15 . They are most common in late summer . In the Northern Hemisphere , September has been pinpointed as the prime month of formation . Waterspouts are frequently observed off the east coast of Australia , with several being described by Joseph Banks during the voyage of the Endeavour in 1770 .

= = Life cycle = =

There are five stages to the waterspout life cycle . Initially , a prominent circular , light @-@ colored disk appears on the surface of the water , surrounded by a larger dark area of indeterminate shape . After the formation of these colored disks on the water , a pattern of light and dark @-@ colored spiral bands develop from the dark spot on the water surface . Then , a dense annulus of sea spray , called a cascade , appears around the dark spot with what appears to be an eye . Eventually , the waterspout becomes a visible funnel from the water surface to the overhead cloud . The spray vortex can rise to a height of several hundred feet or more and often creates a visible wake and an associated wave train as it moves . Eventually , the funnel and spray vortex begin to dissipate as the inflow of warm air into the vortex weakens , ending the waterspout 's life cycle .

= = Nautical threat = =

Waterspouts have long been recognized as serious marine hazards . Stronger waterspouts pose threats to watercraft , aircraft and people . It is recommended to keep a considerable distance from these phenomena , and to always be on alert through weather reports . The United States National Weather Service will often issue special marine warnings when waterspouts are likely or have been sighted over coastal waters , or tornado warnings when waterspouts are expected to move onshore .

Incidents of waterspouts causing severe damage and casualties are rare . However , there have been several notable examples . The Malta tornado in 1555 was the earliest record of a deadly waterspout . It struck the Grand Harbour of Valletta , sinking four galleys , numerous boats , and claiming hundreds of lives . The 1851 Sicily Tornadoes were twin waterspouts that made landfall in western Sicily , ravaging the coast and countryside before ultimately dissipating back again over the sea .

= = Animal threat = =

Depending on how fast the winds from a waterspout are whipping , anything that is within about one yard of the surface of the water , including fish of different sizes , frogs , and even turtles , can be lifted into the air . A waterspout can sometimes suck small animals such as fish out of the water and all the way up into the cloud . Even if the waterspout stops spinning , the fish in the cloud can be carried over land , buffeted up and down and around with the cloud ? s winds until its currents no longer keep the flying fish in the atmosphere . Depending on how far they travel and how high they are taken into the atmosphere , the fish are sometimes dead by the time they rain down . People as far as 100 miles inland have experienced raining fish . Fish can also be sucked up from rivers , but raining fish is not a common weather phenomenon

= = Research and forecasting = =

= = = Szilagyi Waterspout Index (SWI) = = =

The Szilagyi Waterspout Index (SWI) , developed by Canadian meteorologist Wade Szilagyi , is used to predict conditions favorable for waterspout development . The SWI ranges from ? 10 to + 10 , where values greater than or equal to zero represent conditions favorable for waterspout development .

= = = International Centre for Waterspout Research (ICWR) = = =

The ICWR is a non governmental organization of individuals from around the world who are interested in the field of waterspouts from a research , operational and safety perspective . Originally a forum for researchers and meteorologists , the ICWR has expanded interest and contribution from storm chasers , the media , the marine and aviation communities and from private individuals .