

TED演讲者: Heidi M. Sosik | 海蒂 M·索西克

演讲标题: The discoveries awaiting us in the ocean's twilight zone | 在海洋过渡带中, 等待着我们的新发现

内容概要: What will we find in the twilight zone: the vast, mysterious, virtually unexplored realm hundreds of meters below the ocean's surface? Heidi M. Sosik of Woods Hole Oceanographic Institution wants to find out. In this wonder-filled talk, she shares her plan to investigate these uncharted waters, which may hold a million new species and 90 percent of the world's fish biomass, using submersible technology. What we discover there won't just astound us, Sosik says -- it will help us be better stewards of the world's oceans. (This ambitious plan is one of the first ideas of The Audacious Project, TED's new initiative to inspire global change.)

我们会在过渡带这一海面下数百米、广阔神秘却又未曾被探索的水体中发现什么呢? 来自伍兹霍尔海洋研究所的海蒂 M·索西克希望给出答案。在这场精彩的演讲中, 她分享了利用潜水技术探索蕴含着百万种新生物, 以及世界上90%的鱼类生物的未知水域的计划。索西克说道, 探索发现不仅会令我们感到吃惊, 还会帮助我们更好的管理海洋。(这一有野心的计划是“创新项目”最早的几个想法之一, 由TED开启, 致力于激发全球性的改变。)

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I bet all of you are **familiar with** this view of the ocean, but the thing is, most of the ocean looks nothing like this.

我相信你们都熟悉这样的海洋, 但事实是, 海洋的大部分地方 并不是这样的景象。[00:12]

Below the **sunlit** surface waters, there's an **otherworldly** realm known as the **twilight** zone.

在水面下阳光照射不到的地方, 则是另一个非凡的世界, 即所谓的过渡带。[00:21]

At 200 to 1,000 meters below the surface, sunlight is barely a **glimmer**.

在水面下200米到1000米的深处, 阳光几乎无法到达。[00:28]

Tiny particles **swirl** down through the darkness while **flashes** of **bioluminescence** give us a clue that these waters **teem** with life: **microbes**, **plankton**, fish.

微小的颗粒在黑暗中旋转, 而生物体发出的微光 告诉我们这里充满着生命: 微生物, 浮游生物, 鱼类。[00:33]

Everything that lives here has amazing **adaptations** for the challenges of such an extreme environment.

所有生活在这里的生命体 都对这极端环境下的 挑战有着惊人的适应力。[00:46]

These animals help support top **predators** such as whales, tuna, **swordfish** and sharks.

这些生物支撑了食物链顶端的 猎食者, 譬如鲸鱼, 金枪鱼, 旗鱼以及鲨鱼的生存。[00:53]

familiar with: 熟悉 **sunlit**: adj. 阳光照射的; 被日光照射了的 **otherworldly**: adj. 来世的; 超脱尘俗的 **twilight**: n. 黎明, 黄昏; 薄暮; 衰退期; 朦胧状态/adj. 昏暗的, 微明的; 暮年的 **glimmer**: n. 微光; 闪光; 少许/vi. 闪烁; 发微光 **swirl**: n. 漩涡; 打旋; 涡状形/vi. 盘绕; 打旋; 眩晕; 大口喝酒/vt. 使成漩涡 **flashes**: n. 闪光灯(flash的复数形式); 光芒; 披峰/v. 闪光; 反射(flash的单三形式) **bioluminescence**: n. 生物体之发光 **teem**: vi. 大量出现; 充满/vt. 倒出 **microbes**: n. 细菌, [微]微生物; 微生物类(microbe的复数形式) **plankton**: n. 浮游生物(总称) **adaptations**: n. 适应; 改编(adaptation的复数) **predators**: [动]捕食者/[动]食肉动物(predator的复数) **swordfish**: n. 箭鱼

There could be 10 times more fish **biomass** here than **previously** thought.

这里的鱼类生物量含量是 之前推算的十倍。[01:00]

In fact, maybe more than **all the rest** of the ocean combined.

事实上, 可能比海洋 其他部分的总和还要多。[01:05]

There are **countless undiscovered** species in deep waters, and life in the twilight zone is **intertwined** with earth's climate.

在深海, 有无数尚未被发现的物种, 而过渡带中的生命 与地球气候息息相关。[01:10]

Yet the twilight zone is virtually **unexplored**.

然而, 过渡带几乎未被探索过。[01:20]

There are so many things we still don't know about it.

我们对它仍然知之甚少。[01:24]

I think we can change that.

我认为我们可以改变这一现状。[01:27]

I was drawn to **oceanography** by just this kind of challenge.

这类的挑战让我 对海洋学产生了兴趣。[01:30]

To me it represents the perfect **intersection** of science, technology and the unknown, the spark for so many **breakthrough discoveries** about life on our planet.

对我来说, 这代表了科学, 技术以及未知的完美交融, 这导致了许许多多有关 地球生物的突破性发现。[01:34]

As a college student, I went on an **expedition** across the Atlantic with a team of scientists using a **high-powered** laser to measure **microscopic algae**.

当我还在读大学时, 我和一群科学家 在大西洋上进行远洋考察, 利用高强度激光 测量微型藻类。[01:45]

biomass: n. (单位面积或体积内的)[生态]生物量 **all the rest**: 其他所有相关信息 **countless**: adj. 无数的; 数不尽的 **undiscovered**: adj. 未被发现的; 未勘探的 **intertwined**: adj. 缠绕的; 错综复杂的/v. 使缠结, 缠绕(intertwine的过去式) **unexplored**: adj. [地质]未勘查过的 **oceanography**: n. 海洋学 **intersection**: n. 交叉; 十字路口; 交集; 交叉点 **expedition**: n. 远征; 探险队; 迅速 **high-powered**: adj. 高性能的; 精力充沛的; 强有力的; 马力大的 **microscopic**: adj. 微观的; 用显微镜可见的 **algae**: n. [植]藻类; [植]海藻

The wild thing that happened on that trip is that we discovered what everyone who looked before had completely missed: **photosynthetic** cells smaller than anyone thought

那次航行中有一个意外收获, 我们发现了之前被所有人 忽略了的东西: 光合细胞比任何人想象的都要小。[01:57]

possible.

We now know those tiny cells are the most abundant photosynthetic **organisms** on earth.

This amazing discovery happened because we used new technology to see life in the ocean in a new way.

I am convinced that the discoveries **awaiting** us in the twilight zone will be just as **breathhtaking**.

We know so little about the twilight zone because it's difficult to study.

It's **exceedingly** large, **spanning** from the Arctic to the Southern Ocean and around the globe.

It's different from place to place.

It changes quickly as the water and animals move.

And it's deep and dark and cold, and the pressures there are **enormous**.

photosynthetic: adj.[生化]光合的;光合作用的 **organisms**: n.[生物]生物体(organism的复数);[生物]有机体 **awaiting**: v.(事件等)等待(处理);等候;期待;即将降临到...身上(await的ing形式) **breathhtaking**: adj.惊人的;惊险的;令人激动的 **exceedingly**: adv.非常;极其;极度地;极端 **spanning**: n.[数]生成,长成;跨越;拉线/v.横跨(span的ing形式);用柞丈量 **enormous**: adj.庞大的,巨大的;凶暴的,极恶的

What we do know is **fascinating**.

You may be imagining huge monsters **lurking** in the deep sea, but most of the animals are very small, like this **lantern** fish.

And this fierce-looking fish is called a bristlemouth.

Believe it or not, these are the most abundant **vertebrates** on earth and many are so small that a dozen could fit in this one tube.

It gets even more interesting, because small size does not stop them from being powerful through sheer number.

Deep, **penetrating sonar** shows us that the animals form dense layers.

You can see what I mean by the red and yellow colors around 400 meters in these data.

So much sound **bounces** off this layer, it's been mistaken for the ocean bottom.

But if we look, it can't be, because the layer is deep during the day, it rises up at night and the pattern **repeats day after day**.

fascinating: adj.迷人的;吸引人的;使人神魂颠倒的/v.使...着迷;使...陶醉(fascinate的ing形式) **lurking**: n.(新用户的)“潜伏”(在USENET上作为旁观者,不参加讨论) **lantern**: n.灯笼;提灯;灯笼式天窗 **vertebrates**: n.[脊椎]脊椎动物(vertebrate的复数) **penetrating**: adj.渗透的;尖锐的;有洞察力的/v.穿透;贯穿(penetrate的ing形式) **sonar**: n.声纳;声波定位仪(等于asdic) **bounces**: n.弹,跳(bounce的复数);蹦跳/v.弹回;蹦跳(bounce的三单形式) **repeats**: 重复 **day after day**: 日复一日

This is actually the largest animal migration on earth.

It happens around the globe every day, **sweeping** through the world's oceans in a massive living wave as twilight zone **inhabitants** travel hundreds of meters to surface waters to feed at night and return to the relative safety of deeper, darker waters during the day.

These animals and their movements help connect the surface and deep ocean in important ways.

The animals feed near the surface, they bring carbon in their food into the deep waters, where some of that carbon can **stay behind** and remain isolated from the atmosphere for hundreds or even thousands of years.

In this way, the migration may help keep carbon **dioxide** out of our atmosphere and limit the effects of global warming on our climate.

But we still have many questions.

We don't know which species are **migrating**, what they're finding to eat, who is trying to eat them or how much carbon they are able to transport.

现在我们知道这些 微小的细胞,是地球上 最丰富的光合生物体。[02:09]

正因为我们采用了新的技术,用新的方式来观察海洋中的生命,我们才得以有这一惊人的发现。[02:15]

我深信,在那片过渡带中 等待我们发现的未知事物,会同样令人激动。[02:24]

我们对过渡带知道的太少了,因为它很难研究。[02:31]

它实在太大了,从北极到南大洋,覆盖全球。[02:36]

不同地点还有所不同。[02:41]

随着水流和动物的运动,它也快速变化着。[02:43]

它是那么的深邃,黑暗,寒冷,那里的压力也很大。[02:47]

我们已经知道的就很不可思议了。[02:52]

你可能想象着,巨型怪物潜伏在深海,但那里的大部分动物都很小,就像这灯笼鱼一样。[02:56]

这种面目狰狞的鱼叫做圆罩鱼。[03:11]

信不信由你,这是 地球上最多的脊椎生物,它们大都很小,这一管可以装下许多条。[03:14]

更有趣的是,因为小的体型并没有阻止 它们通过数量变得强大。[03:24]

水下的穿透声呐向我们展示,这些动物组成了厚厚的一层。[03:32]

你可以从这组数据中 大约四百米处的红色和黄色得到一个直观的概念。[03:37]

大部分声波从这层反弹,它曾被误认为是海洋底部。[03:42]

但是如果仔细观察,这不可能,因为这层物质在白天位于深处,而在夜晚它上升了,而且这个模式每天都在重复。[03:48]

这事实上是地球上最大的动物迁徙。[03:58]

每天它都在全球范围内发生着,以巨大的生物波浪席卷全球的海洋。那时,过渡带中的生物会在夜晚迁移数百米到水面觅食,然后在白天回到更深、更暗,相对安全的水体中。[04:02]

这些动物以及它们的运动 以重要的方式 连接着表层海面 and 深层海体。[04:19]

它们在海面觅食,将它们食物中的碳带到深海,有些碳可以留在那儿,和大气圈隔绝几百,甚至几千年。[04:26]

这么一来,迁移可以帮助吸收 大气圈中的二氧化碳,限制全球变暖对气候的影响。[04:43]

但我们仍有许多问题。[04:55]

我们不知道何种生物在迁移,它们吃些什么,又被谁吃掉,或是它们可以转移多少的碳。[04:56]

sweeping: n.扫除;垃圾/adj.彻底的;广泛的;扫荡的/v.打扫;扫除(sweep的现在分词形式)	inhabitants: n.居民(inhabitant的复数)
stay behind: 留下来	dioxide: n.二氧化物
migrating: v.迁移;迁徙/移居(migrate的ing形式)	
So I'm a scientist who studies life in the ocean.	我是一名研究 海洋生物 的科学家。[05:07]
For me, curiosity about these things is a powerful driver, but there's more to the motivation here.	对我而言,对这些生物 的好奇心是很强的驱动力,但动机却远不止如此。[05:11]
We need to answer these questions and answer them quickly, because the twilight zone is under threat.	我们需要回答这些问题,并要尽快回答,因为过渡带面临着威胁。[05:19]
Factory ships in the open ocean have been vacuuming up hundreds of thousands of tons of small, shrimp-like animals called krill.	公海中的捕鱼船 正在灭绝性地捕捉着 成百上千吨 叫做 磷虾 的小型虾类生物。[05:27]
The animals are ground into fish meal to support increasing demands for aquaculture and for nutraceuticals such as krill oil.	这些磷虾被碾碎制成鱼食,以支撑水产业,以及对 譬如虾油的保健品 不断增长的需求。[05:35]
Industry is on the brink of deepening fisheries such as these into the mid-water in what could start a kind of twilight zone gold rush operating outside the reach of national fishing regulations .	捕鱼业就要触及到更深 的海域,进入中层水体,这可能会开启一场 在国家渔业管理范围之外的 过渡带的“淘金潮”。[05:43]
This could have irreversible global-scale impacts on marine life and food webs.	这可能会对全球范围的 海洋生物和食物网 造成不可逆的影响。[05:56]
motivation: n.动机;积极性;推动 in the open: 在户外;在野外 vacuuming: n.真空处理;资料移除/vt.吸尘(vacuum的现在分词形式);用真空吸尘器打扫 aquaculture: n.[水产]水产养殖;水产业 nutraceuticals: n.保健营养品; 营养药品; 营养物质, 营养素; 保健品(nutraceutical的复数) brink: n.(峭壁的)边缘 deepening: n.加深,延深;向下侵蚀/v.使深化;加深(deepen的现在分词) fisheries: n.渔业;渔场(fishery的复数);捕鱼术;渔业公司 regulations: n.[管理]条例;规程(regulation的复数);章程 irreversible: adj.不可逆的; 不能取消的; 不能翻转的 impacts: n.影响(impact的复数);[力]冲击/v.压紧;冲撞;对...产生不良影响(impact的三单形式)	
We need to get out ahead of fishing impacts and work to understand this critical part of the ocean.	我们需要领先捕鱼的影响一步, 努力理解海洋中 这一重要组成部分。[06:04]
At Woods Hole Oceanographic Institution, I'm really fortunate to be surrounded by colleagues who share this passion.	在伍兹霍尔海洋研究所,我十分有幸加入有着 同样热情的同行队伍中。[06:10]
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Together, we are ready to launch a large-scale exploration of the twilight zone.	我们已经一起为 大规模的过渡带探索 做好准备。[06:17]
We have a plan to begin right away with expeditions in the North Atlantic, where we'll tackle the big challenges of observing and studying the twilight zone's remarkable diversity .	我们计划从北大西洋的 科考开始,在那里我们会着手解决 过渡带的复杂多样性 为观测和研究带来的巨大挑战。[06:23]
This kind of multiscale, multidimensional exploration means we need to integrate new technologies.	这一多规格,多层次的考察 意味着我们需要引入新的技术。[06:34]
Let me show you a recent example that has changed our thinking.	让我说一个最近的例子,这改变了我们的思考。[06:42]
Satellite tracking devices on animals such as sharks are now showing us that many top predators regularly dive deep into the twilight zone to feed.	在譬如鲨鱼等动物 身上的卫星追踪器 告诉我们,许多顶层捕食者 会经常潜入深海觅食。[06:46]
critical: adj.鉴定的; [核]临界的; 批评的, 爱挑剔的; 危险的; 决定性的; 评论的 Oceanographic: adj.海洋学的;有关海洋学的(等于oceanographical) large-scale: adj.大规模的,大范围的;大比例尺的 right away: 立刻 expeditions: n.探险(expedition的复数);远征 observing: adj.观察的;注意的;观察力敏锐的/v.观察;遵守(observe的ing形式) remarkable: adj.卓越的; 非凡的; 值得注意的 diversity: n.多样性;差异 multiscale: n.多尺度;多量程;多道定标/adj.多量程的 multidimensional: adj.[数]多维的;多面的	
And when we map their swimming patterns and compare them to satellite data, we find that their feeding hot spots are linked to ocean currents and other features.	当我们绘制它们的游动路径,并将其与卫星数据比较时,我们发现它们经常觅食的地点,与洋流和其他特质有着联系。[06:57]
We used to think these animals found all of their food in surface waters.	我们曾经认为这些动物 在水体表层就能获得所有的食物。[07:08]
We now believe they depend on the twilight zone.	现在我们相信它们依赖着过渡带。[07:13]
But we still need to figure out how they find the best areas to feed, what they're eating there and how much their diets depend on twilight zone species.	但是我们仍需要搞清楚,它们是如何找到最佳地点觅食的,它们在那里吃些什么,以及它们的饮食中有多少 是依赖过渡带生存的物种。[07:17]
We will also need new technologies to explore the links with climate.	我们也需要新的技术 来探索(它们)与气候之间的联系。[07:28]
Remember these particles?	还记得这些微粒吗? [07:33]
Some of them are produced by gelatinous animals called salps .	它们中的有些是由一种 叫做樽海鞘的胶装动物产生的。[07:35]

Salps are like superefficient vacuum cleaners , slurping up plankton and producing fast-sinking pellets of poop -- try saying that 10 times fast -- pellets of poop that carry carbon deep into the ocean.	樽海鞘就像强力吸尘器一样,吸食着浮游生物,并产生着 会快速下沉的排泄物颗粒—— 想象把我的语速加快十倍—— 携带着碳的排泄物,沉入深海。 [07:39]
diets : [食品]饮食 gelatinous : adj.凝胶状的,胶状的 salps : n.樽海鞘;萨尔帕属之被囊动物 superefficient : 超高效的 cleaners : n.洗衣店 slurping : 啜食(slurp的现在分词) pellets : n.芯块,小球(pellet的复数);靶丸/v.使形成小球(pellet的第三人称单数) poop : n.船尾;傻子;内幕消息/vt.使精疲力尽;使船尾受击/vi.疲乏;排便	
We sometimes find salps in enormous swarms .	有时,我们发现樽海鞘成群出现。 [07:54]
We need to know where and when and why and whether this kind of carbon sink has a big impact on earth's climate.	我们需要了解哪里,何时,为何,以及是否 这种“碳缸”会对地球气候 产生巨大的影响。 [07:58]
To meet these challenges, we will need to push the limits of technology.	为了面对这些挑战, 我们需要推进技术的极限。 [08:07]
We will deploy cameras and samplers on smart robots to patrol the depths and help us track the secret lives of animals like salps.	我们会使用智能机器人身上的 摄像头和样本采集器 在深处考察,帮助我们追踪 像樽海鞘这样生物的 隐秘生活。 [08:11]
We will use advanced sonar to figure out how many fish and other animals are down there.	我们会使用先进的声呐,来搞清那里生活着 多少鱼类和其他动物。 [08:20]
We will sequence DNA from the environment in a kind of forensic analysis to figure out which species are there and what they are eating.	我们会用类似法医分析的方法, 对环境中的DNA进行测序, 来搞清哪些生物生活在哪里, 以及它们吃些什么。 [08:27]
With so much that's still unknown about the twilight zone, there's an almost unlimited opportunity for new discovery.	过渡带中充满着未知, 也就意味着那里蕴藏着 新发现的无限可能。 [08:36]
Just look at these beautiful, fascinating creatures.	看看这些美丽的, 令人着迷的生物吧。 [08:44]
We barely know them.	我们对它们几乎一无所知。 [08:47]
swarms : n.(昆虫等)群;[蜂]蜂群(swarm的复数)/v.蜂拥;云集(swarm的第三人称单数) samplers : n.采样(sampler的复数);[自]取样器 patrol : n.巡逻;巡逻队;侦察队/vt.巡逻;巡查/vi.巡逻;巡查 forensic : adj.法院的;辩论的;适于法庭的 unlimited : adj.无限制的;无限量的;无条件的	
And imagine how many more are just down there waiting for our new technologies to see them.	想象一下,在深海中 有多少东西正等待着我们 用新的技术去发现。 [08:50]
The excitement level about this could not be higher on our team of ocean scientists, engineers and communicators .	我们全队的科学家,工程师和通讯员 都对这一发现 兴奋至极。 [08:56]
There is also a deep sense of urgency .	大家也都有了一种深深的急迫感。 [09:04]
We can't turn back the clock on decades of overfishing in countless regions of the ocean that once seemed inexhaustible .	我们不可能将时光 倒转到过渡捕鱼之前, 那时,捕鱼在曾经 看上去永不枯竭的 无数海域进行着。 [09:08]
How amazing would it be to take a different path this time?	如果这次我们换条航线, 该有多好呀? [09:18]
The twilight zone is truly a global commons.	过渡带确实是一种全球公共资源。 [09:23]
We need to first know and understand it before we can be responsible stewards and hope to fish it sustainably .	我们首先需要知道并了解它, 然后我们才能负责任的管理, 并进行可持续性的开采捕捞。 [09:26]
This is not just a journey for scientists, it is for all of us, because the decisions we collectively make over the next decade will affect what the ocean looks like for centuries to come.	这不是一场事关科学家的旅程, 这与我们所有人息息相关, 因为我们在接下来十年 共同做出的决定, 会影响数世纪之内, 海洋的形态。 [09:36]
communicators : n.交流者;通讯器(communicator的复数) urgency : n.紧急;催促;紧急的事 turn back the clock : 把钟拨慢 overfishing : n.渔捞过度/vt.过度捕捞(overfish的现在分词) inexhaustible : adj.用不完的;不知疲倦的 stewards : n.干事;管理员;服务员(steward的复数)/v.管理;当管理员(steward的三单形式) sustainably : adv.支撑得住;能保持住地 collectively : adv.共同地,全体地 make over : 转让;移交;修改	
Thank you.	谢谢。 [09:50]
(Applause)	(掌声) [09:51]

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